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THE AMERICAN GAS LIGHT JOURNAL

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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Pacific Coast Gas Association, Second Annual Meeting.

OFFICE OF THE SECRETARY, OAKLAND, CAL., March 5, 1894.

Upon the suggestion of Mr. Jos. B. Crockett, our President, and with the concurrence of the Directory, it has been decided to hold the next meeting of this Association at Sacramento, on Tuesday and Wednesday, the 15th and 16th of May, 1894.

This has been done to afford an opportunity to members to combine the business of our annual conclave with the pleasure of a visit to the Midwinter Fair, as the time appointed by the by-laws would be after the Fair had closed, and many if not all of the members who live at a distance from San Francisco will thereby be saved the necessity of making two trips to the bay.

Our first meeting was a complete success—the second will not be behind it in interest. Already papers are promised upon topics of interest to gas men, among them being "Practical Analysis of Gas," illustrated with complete apparatus, "Proper Books of Record for Gas Companies," and "Prepayment Meters."

Each member's presence is necessary to the preservation of an organization whose ultimate object is the bringing together in unity of thought and action the gas fraternity. Come prepared to ask questions, to give and receive information. The good accomplished by the last meeting has been felt throughout the year in better results of manufacture and distribution. The pertinent question personally asked and answered is productive of more results than volumes of print.

In order that arrangements may be made for your care and comfort while at Sacramento, please advise me on receipt of this if you intend to be present. You will be later advised concerning headquarters, place of meeting, hotel accommodations, etc.

We want at this meeting a perfect circulation of members, and no dead ends. Yours very truly, JOHN A. BRITTON, Secretary.

[OFFICIAL NOTICE.]

Seventeenth Annual Meeting, Western Gas Association.

SECRETARY'S OFFICE, WESTERN GAS ASSOCIATION, QUINCY, ILLS., April 9, 1894.

The seventeenth annual meeting of the Western Gas Association will be held at Cleveland, O., on the 16th, 17th and 18th of May.

The Hollenden, strictly first-class in all its appointments, will be the Association's headquarters, and its business sessions will also be conducted therein.

It is intended that an exhibit of gas appliances shall form one of the prominent features of the Cleveland meeting, and to this end a commodious storeroom, directly across the street from the Hollenden, has been engaged. Manufacturers and dealers in stoves, ranges, burners, lamps, engines and all forms and types of apparatus or machinery by which the manifold uses of gas can be exhibited, are respectfully invited to display their wares; and they can feel assured that, on this occasion, the same will be critically inspected by large and appreciative audiences. Communications on the subject can be addressed to Mr. M. S. Greenough, General Manager of the Cleveland Gas Light and Coke Company, who will take pleasure in furnishing to exhibitors all requisite information in the matter.

Geo. T. Thompson, of the Laclede Gas Light Company, St. Louis, Mo., has been appointed Superintendent of the Wrinkle Department for the coming meeting, and to him should be addressed all contributions to or communications bearing on subjects connected with said department, while all matter for the Question Box should be mailed to the Secretary.

The undersigned will be pleased to reply to all communications requesting detailed information concerning the meeting, not covered by this announcement and the notices which are to follow.

A. W. LITTLETON, Secretary.

BRIEFLY TOLD.

SECRETARY LITTLETON NAMES THE TIME AND PLACE.—The clever and capable Secretary of the Western Gas Association names, in the current issue of the JOURNAL, the time and place for holding the 17th annual meeting of the Western Association, from which it will be seen, as previously intimated by us would be the case, that the sessions are to be held in the select and comfortable Hollenden Hotel, in Cleveland, which house has also been designated as headquarters. Those who have attended the meetings of the various Associations we think will be unanimous in assenting to the statement that those conventions which have been fortunate enough to have been brought off with meeting room and headquarters under the same roof have always been the most successful, in that there is less of extraneous happening to distract the delegates, and that greater opportunities for comparing notes are afforded. We are certain that the exhibition of gas appliances which is being arranged for will be superior by far to anything of the kind hitherto attempted in this country; but in order to prevent confusion, manufacturers who propose to take part in it, and to share to the greatest possible degree in its bene-

fits, should communicate at once with Mr. Greenough in respect of securing the necessary floor space and so on. We presume the system of grouping the kindred types of apparatus will be followed, wherefore the greater need of the exhibitors to be early on hand with their declarations. The paper list has not been completed, but sufficient about it is known to show that the Western is to have a sufficiency of matter for debate. The proposed "Wrinkle Department" has been wisely committed to the wrinkly expertness of Mr. G. T. Thompson, of St. Louis, which means that it is in capable custody. The entertainment is to be on an unusually lavish scale; and, in fact, everything points to a most enjoyable convention.

Death of Mr. Henry P. Morgan.—We regretfully report the sudden death of Mr. Henry P. Morgan, President of the Nassau Gas Light Company, of Brooklyn, N.Y., whose demise occurred at his home, 162 Columbia Heights, that city, on the evening of Sunday, April 8th. Mr. Morgan, while not in any sense a gas engineer, contributed largely to the great success attained by the Nassau Company through his conservative financiering and courageous administration of its politics. This latter fact is well borne out by the stand taken by him some years ago, when his Company's fortunes were threatened by the guerilla-like attitude of those behind the Fulton-Municipal Company and one other Brooklyn gas making concern. Sustained by the counsels of his associates—men of the sterling stamp of E. D. White—the bushwhackers were beaten at their own game, and the Nassau Company went on to fortune unplucked. Mr. Morgan, who was a native of Connecticut, came to Brooklyn when about the age of 14 (in 1836), and engaged in the dry goods business, retiring therefrom in 1867. Meanwhile he acquired interests in other directions, notably in life insurance and banking; and his name is to be found on the Directorates of several wealthy corporations. Possibly, however, the institution which claimed his very best endeavors was the Brooklyn Savings Bank, a repository for the savings of the masses that enjoys national repute for soundness, and which will soon remove to its new palatial home on Pierrepont street—the building of which structure was watched with jealous eyes by Mr. Morgan, who had been its President since 1880. He was also a Trustee of Brooklyn's famous school for females—the Packer Institute, and was senior warden of St. Anne's Episcopal Church for something like 40 years. Mr. Morgan was a man of honor and probity, whose tenacity of purpose and regard for justice in commercial dealings were tempered by no desire to benefit himself to the injury of others. He was of the type of whom it may be said the world was made better by their having lived in its ways. A widow and three children survive him.

Two Ways of Looking at it.—In our item columns will be found an extract from the annual report of the official gas inspector of Allegheny county, Pa.—Mr. J. W. Patterson—who gives it as his opinion that, as between the service by the gas companies of that county and the electric light companies of the same district, to the people who pay for the respective sorts of illumination named, the gas consumer has the better of it by 100 per cent. in cost and 20 per cent. in illumination, and, when other factors which enter into the analysis are computed, that as a whole, the gas consumer is three times better off than is his neighbor, the user of incandescent electric light. On the other hand, in our installment of the official report of the meeting of the Ohio Gas Light Association is to be found a paper, by Dr. Howard Jones, President of the Circleville Light and Power Company, a corporation which supplies gas and electric light from a common center, in which the writer affirms that, with only a predicated difference of 10 cents in the rate for an electric lighting supply over the rate for a gas supply presumably equal to that required by the former agent, the proportion of electric consumers to gas consumers is as 6 to 9; further, the Doctor believes that in the not distant future the ratio will be even. The conditions governing the manufacture and distribution of gas and electric currents in Pittsburgh and Circleville are not greatly apart—that is, in respect of wages, materials, etc.—nor is there any wide variation in the gas rates of the two places, the average rate in Allegheny county being $1.09 per 1,000, whereas in Circleville the average of the whole quantity sent out (gas for fuel is sold very cheap in Circleville) probably does not exceed $1.20 per 1,000. There is, of course, a difference in candle power, the average in Allegheny county being 21.07 as against, say, 17.25 in Circleville; but this would not seem to be sufficient to account for the disparity in ratio of gas to electric light consumers in the named places, which in Allegheny is possibly gas 7, electricity 1, instead of, as at Circleville, gas 9, electricity 6. The probability is that Doctor Jones does not get enough money for his electric service in Circleville, a fact that time can be counted on confidently to prove.

[Official Report—Revised by the Secretary—Continued from Page 520.]

TENTH ANNUAL MEETING OF THE OHIO GAS LIGHT ASSOCIATION.

Held at Columbus, O., March 21 and 22, 1894.

Second Day—Thursday, March 22—Morning Session.

The convention having been called to order, the President announced that the first business would be the reading of the paper, by Mr. W. C. Boyle, of Salem, entitled

GAS COMPANIES AND THE PUBLIC.

We are in the closing years of the most brilliant century the world has ever known—brilliant for the advancement of civil and religious liberty; for material development; for scientific research; for discoveries and inventions which have added to the comfort and happiness of man. In no country has this been so marked as our own. In 1800 our nation was an experiment. To day it acknowledges no peer.

No one element has given greater impulse to the growth and development of our country during this period than the granting of corporate powers and the concentration of capital. By this means, enterprises which were beyond the reach of individual effort have been undertaken and accomplished. Ocean has been joined to ocean, and from the lakes to the gulf has been made but a span. Distance, rivers, mountains, chasms, canyons and deserts, have proved no barrier to the enterprise and genius of our people, aided by capital. Parallel lines of steel have been pushed into every part of the country. The great plains of the West have been covered with homes, to which the products of the factory and loom are brought, and from which the riches of the soil are taken. The hum of wheels, the clang of machinery, the roar of furnaces, heard all over the land, are but different strains of music wrought by the magic of corporate power. Nor is this all. Through the same influence the comforts and luxuries of the home have been multiplied. Water, fuel and light have been developed and placed to man's convenient use.

Still he is not content. And it seems as if his desires grow with every new invention for his happiness. His complaints are naturally turned against the corporations which have benefited him most. They have no power to talk back or to inflict corporal punishment. The poor attribute their poverty to the centralization of capital; the demagogue widens the breach by proclaiming that the rich are growing richer, and the poor, poorer—and corporations, of course, are classed among the rich; the populist's wail is that corporations are grinding the face of the poor; the anarchist, thus encouraged, raises the cry against monopolies, and classes all corporations as such; the laborer creates monopolies of labor to cope with capital; and the pubic are continually demanding new benefits, and imposing additional burdens for the grants conferred. We see this manifest in legislative bodies from the highest to the lowest. Village and city councils grant new franchises grudgingly, and with increasing burdens. Legislatures enact laws which tend to reduce revenue upon one hand and increase expenses upon the other, thus making a twofold onslaught upon the incomes of corporations. Nor are the halls of Congress inattentive to the popular demand. The predominant party in the House have recently sought to win favor to an odious income tax by casting its principal burden upon corporations.

The hostility to corporations has become so deep-seated that their rights are seldom considered or justice awarded them by a jury. The well-established presumption of innocence is too often disregarded, and the corporation prejudged guilty by reason of its soulless existence.

Unfortunately, gas companies are no exception to the rule. Indeed, they are particularly exposed to the injustice of the popular ill-will. In villages as well as large cities, the cry of monopoly is raised against them. While no exclusive franchises are given, it is true that the company first established enjoys a decided advantage, and makes more difficult and precarious the investment of capital in a like project by others. But it is also true that gas companies deal directly with the people, and their actions are under constant supervision and criticism.

It is the purpose of this paper to discuss the reason for this prejudice, and its remedy. For a large share of the prejudice there is no reason, and consequently no remedy.

These troubles arise, in a large measure, from the natural instincts of men. They are naturally selfish, intent upon making or saving money, whether acting individually or as members of a corporation. Gas companies are created for profit. Men do not invest money in such enterprises from philanthropic motives. They think first of the benefit to themselves, and secondly of the benefit to the public. Or, to put it more

kindly, they consider how they can benefit the public by benefiting themselves. The consumer, on the other hand, has no interest in seeing others make money out of him, even if he receives a fair return. He is always on the alert to reduce his own expenses, regardless of the profits others may make. And so the struggle has gone on, and will go on as long as corporations exist. To earn reasonable profit, and at the same time keep the good will of the public, should be the aim of every gas company in the country.

Besides our own sins, we must answer for the sins of our predecessors. The latter experienced no difficulty in securing a franchise from the village or city council. The enterprise was approved by the people, and every reasonable encouragement was given. So it happened that these pioneer companies received liberal grants from the public, and were disposed to profit too much by their position. They often became arbitrary. Reasonable requests of the public were often disregarded. There was no fear of competition, for electricity was not in the field. Punishment was out of the question. There were no reservations in the contract. Profits were handsome, and the stock was often watered to accommodate the surplus earnings. The members of these companies too often forgot that they were quasi-public corporations. They too often assumed that the public had no rights that they were bound to respect. It is said that the public is "long-suffering." It may have been in those days, but I doubt if any of us has ever discovered it in these times; yet I believe concessions made at that time would have saved us much trouble now. But they were not granted. Relief was sought in strengthening the hand of the public. Legislation was secured giving councils the power to regulate the quality of gas and fix the price at which it might be sold; also to buy or to erect and maintain a municipal plant. When new franchises came to be granted by the city, the contract was carefully prepared. The public was protected in every way, and many onerous burdens were imposed on the company. Protection to the stockholder was a secondary matter. The council realized that the plant was established, the capital invested, and that a franchise with such burdens was better than none at all, and would be accepted by the corporation. To real grievances, imaginary ones were added, and so the breach between the company and the public grew wider and wider. The prejudice thus engendered has descended to the present generation; and to-day there can be found scarcely a legislative or municipal body that is free from it. Corporations, as a rule, have corrected early abuses, and are striving to serve the public upon fair business principles; but they are continually handicapped by having their good intentions misconstrued. Injustice lies in the fact that the scale of burdens is in direct opposition to the scale of prices allowed.

In many instances this action on the part of councils is carried to the point of oppression, and the only recourse of the company is to apply to the courts to escape what is practically a confiscation of property.

We have not so much to fear from the power reposed in councils, as from the character of the men who exercise it. The apathy with which good citizens view municipal and legislative elections is one of the greatest evils of the country. We are more directly interested in city councils, and I will confine myself to them. The position is one of no profit—to an honest man—and of but little honor. Let him act with the best intentions, he will have critics and enemies. The performance of municipal duty is distasteful to the business man. The busy man, the man of ability, and the man of property, too often have no time to give to such matters; or, if they have time, are afraid of injuring their business by making enemies. The result is that we are apt to find in such bodies men who have been selected by political rings or ward politicians, labor agitators and socialists; men of no property; men who fail to recognize the bond between capital and labor and are charmed with the cry of the demagogue against corporations; or men who hope to reap some notoriety by posing as apostles of the people, regardless of property rights; or men who have sought the place to satisfy some revenge, or for a selfish purpose; and men who believe, not that a "public office is a public trust," but a source of private gain.

Bear in mind, I do not assert that all councils are so constituted. There are thousands of good men in the country, who consider it their duty to serve the public in village or city councils and sustain the dignity of the position and the character of the body of which they are members. But what we need is more men of this character. Pure politics, like charity, begin at home. Let us begin by placing good, honest citizens in our municipal offices, giving our personal time and efforts to secure this end. Our conduct in this particular will soon have its effect in the selection of better men for state and national positions. Corporations have much to fear from councils and legislatures composed of men controlled by demagogues, who care little about the rights of others. But I anticipate the reply that corporations gain most by bribery. I deny this. The corporation has more to fear from the nihilist than from the honest man. One would destroy property, the other protect it. One who receives a bribe in the exercise of such a trust is a nihilist at heart. He commits a crime against society and the State. And he who gives a bribe for a breach of such a trust is himself a criminal. Therefore, it is to our interest to recognize our higher duty to the State and do all in our power to select honest men for municipal positions. I would have every member of a gas company a politician to the extent of seeing that the best men, regardless of party, are chosen for municipal positions; and I would have him believe also that no position is so trifling as to be undeserving his attention.

Nor should we rest here. We should turn the light upon our own actions and see if we are dealing fairly with the people. Experience has taught us that it is only by such conduct that we can allay prejudice and retain the confidence of the people. In ethics this principle is called honesty. In practice it is the application of business methods to our industry.

There is no telling when we may have to appeal to the courts for relief against arbitrary measures of city councils. We should go there with clean hands. Equity will only be given to him who has done equity.

Much may be gained and many friends won by paying attention to the details of our contract with the city and of our service to the people. The quality of light should be above rather than below the standard. Care should be taken to restore streets, especially where they are paved, to a perfect condition after excavation. Complaints of customers should be patiently listened to and the trouble remedied if possible. I understand the burden of this task. You cannot always expect to be successful. Some people never will be satisfied, but you can reach the average citizen. He is, on the whole, a reasonable being. A pleasant answer will often turn away wrath and make a friend of a customer. I once knew an employee of a gas company who had an amiable disposition—a rare quality. A sewer excavation had caved in and carried the gas main with it, breaking it in several places. Air got into the system of pipes. My friend explained to an angry customer the cause of the bad gas. "What!" he exclaimed, overlooking in his anger that the accident was unavoidable, "does that air go through my meter?" "Oh no," said the mild gas man, "the *air* goes around the meter." He appreciated the joke, and his anger was lost in the laugh that followed.

Effort should be made to supply the public with the best burners and to instruct them how to keep the same in repair. Strive to give the greatest amount of light with the least amount of gas. This is contrary to the orthodox method of many companies, but I believe our success in the future lies along this line. Here again is the application of a principle recognized among wise business men.

The same thought was well expressed by our President, Mr. Butterworth, in his admirable address on "Governor Burners" last year—viz.:

"The time has gone by—if, indeed, there ever was such a time—when gas companies should desire the lighting bills of their customers to be as large as possible. Their true interest lies in furnishing perfectly satisfactory light for the least possible money. When a gas company can make its bills for a satisfactory lighting amount to less than they would be by any other means than gas, it need have no fear of overwhelming competition. Whoever can furnish satisfactory light the cheapest will get the bulk of the business."

And again: "I was recently astonished to hear the statement made by a gentleman whose business identifies him with the gas interests, that those gas companies are making the most money who are carrying the highest pressure in their street mains, and thereby forcing an excess of gas through their consumers' burners, asserting that the increased leakage was more than compensated for by the increased bills. If there are gas companies who are doing this designedly and as a matter of policy, in my judgment they are making a great mistake. Even if they are not doing it designedly, they are making a great mistake. They are sowing the wind, and will eventually reap the whirlwind. The time will come when they will realize that they have killed the goose that laid the golden egg.

"The holding of our present business, and the adding of new, do not lie in this sort of abuse of our customers, to say nothing of our moral obligation to give them value received. We should study rather to make their bills as small as possible, for the reasons I have given."

The day of high prices and large profits has gone by. We have a great competitor in the field. Behind it are men of energy, capacity, capital and brains. We must not console ourselves with the idea that the maximum efficiency of the dynamo, or of an ampere of electric current, has been reached. We must not hesitate to experiment with lamps that will

give greater efficiency in candle power for less amount of gas. Study carefully the improved methods of generating a high candle power gas. The eye of the public is constantly being trained in the direction of stronger light and more of it. Study your plant carefully, and see that economy is used in every department. There are many "leaks" about the operation of a plant as disastrous as a leak in the main. We owe it to ourselves first, and secondly to the public, to run our works economically. Voluntarily reduce the price of gas whenever it can safely be done, and do not wait until compelled to do so by municipal action. We will make friends and save money by adopting such a course. Let us be infused with the energy that characterizes our competitor. Let us increase the efficiency of our plants, the purity and power of our gas, and keep ahead of competition.

Let us avoid the practice of issuing stock upon a fictitious basis. It is a wrong and vicious custom, and is sure to give trouble in the future. It arouses the suspicion of the court in case you have to appeal to it for protection. No matter how arbitrary and unjust the municipal authorities may be, we will always be sustained by the courts in charging a price for gas which will make a fair return above expenses, repairs and betterments, upon the capital invested; but not upon a false and extravagant capital. For the opposite reason, let us be careful to keep an accurate account of betterments made to the plant, and have stock issued to cover them. By adopting this course we shall have little to fear from councils, courts or the public. Our house will be constantly in order.

It is a difficult task to please the public, and it cannot always be done; but by making a continued, honest, faithful effort in that direction, the business of our companies will grow, and we shall secure a friend here and there who will be ready to stand by us in the hour of need, and shield us from the wound that blind prejudice would inflict.

Discussion.

The President—This paper is one which you have all heard with interest, and I hope you will discuss it freely.

Mr. Cantine—This a very eloquent paper, and splendidly delivered. You can see plainly that Mr. Boyle is an attorney, that he is accustomed to addressing courts, and that he has presented his case to the jury in such a manner that he has already won it, but as he has taken both sides of the question, there is very little to discuss. You cannot take issue with him, because he takes equal blame upon himself and the gas companies as he charges on the public. I don't see any point that you can attack this paper. You will have to agree with him; at least I shall, and I presume you are very much like myself. There seems to be a burden imposed upon corporate capital in every place that you find it. I have asserted several times that I have doubts whether we would have 5 miles of continuous railroad in Ohio if we had to depend upon individual private capital. A few years ago we had almost as many little short lines of railroad in Ohio as we had people who were interested. There were four or five lines between Chicago and Buffalo, each of which had a separate set of officers, all of which had to be maintained out of their meager earnings, and a great hue and cry was raised when these lines were consolidated under the present style of the Lake Shore and Michigan Southern Railway. The Pennsylvania Railroad system came into this State, and it has taken in one system after another—all of these little railroads that could not pay their men. The officers, I believe, usually took care of themselves, but the men who did the work got little or nothing. Now this is all consolidated under one grand system, and every person is better served. The councils of this State, and every other, are opposed to the consolidation of electric light and gas companies under one management, although by doing this the public is better served; and yet, as Mr. Boyle says, "Every nihilist, socialist and demagogue denounces all this thing as entirely improper." They think it would be a great deal better for the municipality to own the plant—not that particular plant, perhaps, but to bond the city or town and get one. Not only is he satisfied to destroy these people's investment, but he charges them a good, round tax. He taxes the property that is ruined and rendered worthless. So far as gas companies being very much in the wrong is concerned, I think I will have to take issue with Mr. Boyle, and I do so from the very fact that being in the business a little myself I believe we do a great deal more for the public—that we do a great deal more thank-you-ma'am work—than they do for us. We do a great deal to serve them, and we could please in almost every other business. If we were in the merchandise business and did as much for nothing in that as we do in the lighting business, we would have the good will of every person in the community. Therefore, I think the gas companies are a little bit better than the public, and if anyone has a sure hold on Heaven it is the men engaged in the gas business. I do not think that if one were to work 30 or 40 years in the gas business, he would ever be condemned to purgatory under any circumstances. I think he has had it on earth; I think his punishment here is really more than he ought to bear.

Mr. Somerville—I wish to point out just one thing here. Mr. Boyle, speaking of pressure, says he has heard of some companies who raised the pressure for the purpose of forcing the gas through the burners. Of course, he understands that the consumer has the power to stop such a thing. It surely ought to be mentioned in the discussion that there is a stop cock at the meter, and no company can put the pressure on unless at the option of the gas consumer. It would be much better in my opinion if the consumer would exercise the privilege and right which he has to control his own pressure; and the gas company cannot increase the pressure unless with the consent of the consumer. The question of pressure, I think, cannot be exactly governed by the company. One man may have too much pressure and another may have too little. A gas company is sometimes obliged to keep on what some men would call an excessive pressure, because much depends upon the fitting of the houses.

Mr. Allen—As Mr. Cantine said, it seems to me the subject has been fully covered; but I am one of those who do not believe that gas companies are as unpopular as some people seem to believe. I have never been able to get that idea into my head. No prosperous institution that I know of escapes the malice of demagogues, be that institution a gas company or what not. A certain class of people are down on any person or persons who are successful in a business way, and I am not inclined to think that they are more down on gas companies than any other line of business that is successful. I believe, too, that a good deal of our trouble comes, as is written in the paper, from past shortsightedness. That is fast disappearing, because the business, from its very nature, in order to get low prices in the ordinary city or town, must be in the nature of a monopoly. A serious mistake is made whenever an institution of that sort undertakes to take advantage of its position, and there will be a reaction that will hurt for a good many years. We must be very kind to the people, do our level best and not lose patience. Just keep right on after it, and finally let it wear out. I don't like the idea of gas men admitting the idea that the gas business is unpopular. It seems to me, if you take the most popular store in town, and let the owner make up his mind that he is unpopular, and that his business is unpopular, and talks it—it won't be very long until he is as unpopular as sin. If other people want to call us unpopular we can't help that; but I think all gas men ought to throw down their coats when that remark is made and say it isn't so.

Mr. Faben—Just a word. I did not hear the paper read, but I have scanned it over, and have only heard the last speech in the discussion. I think one phase of that question was not thoroughly covered; perhaps not presented. I think the attitude of the community towards the gas company is largely a question of location. I have in mind two very successful gas companies. One of these companies adopted the policy of creating the impression in their community that they are barely eking out an existence, that they are an object of pity and commiseration, but in reality they make a great deal of money. I have in mind another very successful company, that think it necessary to create the impression in their community that if everybody else is losing money they are making it—and lots of it. And they are generous people. I think the application of the remedy is largely a matter of location. You must find out what disease ails that community, and the remedy is to be applied according to the disease.

Mr. Cantine—I don't think we should discuss Brother Allen, because he is not before the house and this paper is; but if I said anything to admit that gas companies were unpopular, or that it was an unpopular business, or if he thought we were speaking about the unpopularity of the business, he made a little mistake and misrepresented me. I do not think that way. I only think the public generally are inclined to be a little hard on all corporate bodies. Only last year there was a great effort made to effect the passage of a bill in the Ohio Legislature, taxing the franchises of all the corporations in the State. Now, some of us have a franchise that is not worth very much, and may be is almost run out, and we have earned what we have by a diligent and persistent effort, and I think that the public in that particular is unfair towards us.

Mr. Miller—I was talking the other day to a newspaper manager in a city of 160,000 to 180,000 inhabitants, who owns a gas plant in another city of 4,000 or 5,000 inhabitants. His newspaper business being the largest, he looked at things from a newspaper man's standpoint. He started out with the proposition that public opinion can be controlled. In buying this plant, in that small town, he found it in a rundown condition. He first put his plant in good condition to make a first class,

high candle gas, and a gas that no better could be had in the country. Then he went to the newspapers and bought a space which he could use for whatever he wanted—in the news columns, not in the advertising columns. Then he got people to remark about the gas. One man had traveled all over the country, and had not seen any better gas anywhere. That remark was incidentally dropped into the space. Another man who had traveled a good deal made a similar remark. In this way he got the people in the town so that, although they would say that this company was a grinding monopoly, etc., yet they would acknowledge it was making mighty good gas, and that it was a mighty good company. The output is nearly 18 millions, and the people all think, although the gas company may take advantage of the position at times, yet it is a mighty good company, and furnished mighty good gas. It is all done by handling the people, by a man that is able to do it, through the newspapers; and I think, as he says, that public opinton can be controlled. I don't know anybody willing to combat that remark. If the managers of gas companies will try to control public opinion, they can make people think they are all right. Of course they know themselves they are all right.

Mr. Faben—Mr. Chairman, that is the disease of that community.

Mr. Gwynn—Mr. President, I will have to differ with Mr. Somerville in regard to the question of regulating the pressure at the meter. I think he is wrong there. I don't think the consumer ought to be allowed to touch the stopcock to regulate the pressure. The proper place for him to regulate it is at the burner. If the consumer regulates it at the meter he regulates it for only one period, and for half a dozen burners, say to day; to morrow night he lights 10 or 12 burners, has a bad light, and meets you on the street next day and says that he had a very poor light last night, and wants you to come around and see what the trouble is with the gas. The proper place to regulate it is at the burner and not at the meter.

Mr. Kauke—Just one remark. "We have not so much to fear from the power reposed in councils as from the character of the men who exercises it." A few days ago I came in contact with the wisdom of our council, which is made up of all kinds. Two weeks previous the matter was referred to the Committee on Light, to dispense with gas and put electric light in the fire department. The stockholders came to me and said, "What's to be done?" I made for the chairman of the Committee on Light on the night of the meeting. I found right away he was "fixed." He was an Irish barber and a man of great influence. You know how they are. I addressed a few words to him and it didn't take ten words until I found out he was "fixed."

The President—You got there too late?

Mr. Kauke—Yes. So I went to the meeting of the council. I was a councilman, and found I never knew anything until I got into council, but I found out a great deal after I got into council. The committee reported in effect to wipe out the gas light and put in the electric light; but in about 15 words I laid that on the table. If I hadn't been there, you know what the result would have been. We would not only have lost the fire department, but the Opera House, City Hall, and so on. Often our gas man, who may have influence in the council, don't go there. You better go there and look after it. Talk to them right in the face and you can talk them down; generally this kind of fellow can be talked down. You see, that fellow was paid to make that report. I know he was.

Mr. Allen—Mr. President, a thought just occurs to me. The longer I live the more I am convinced that sometimes human nature and pressure have a near relation to each other. Some time ago one of our customers was going to have a great, big blowout at his house, and everything was in apple-pie order—going to have a big wedding. The lady of the house told me about it, and said she wished we would give them a big pressure of gas that night. I said I was glad she had mentioned it. I knew things were going to be fine, and we would throw on all the pressure we had. I told her to be careful when she lighted it. However, I forgot all about it and didn't order the pressure turned on. Three or four days afterward, as I was driving by, she came out, waving her hands. I stopped, and she said, "Mr. Allen, I want to thank you. I never saw such gas since I was born."

Mr. Somerville—I would like to ask Mr. Gwynn what a stopcock is for, if not for the purpose of regulating the pressure? I have instructed gas consumers, all my life, to shut gas off at the meter until they get the proper light. I put a stopcock on the meter for nothing else than that the consumer can control the pressure. Surely he would have sense enough not to put it so low down that he can't get light.

Mr. Gwynn—I do not put a stopcock on a meter for the benefit of the consumer to regulate his pressure. The stopcock in our case is put in so that if an accident happens in the building we can shut the gas off. The trouble is the consumer regulates it to-night, say, for half a dozen burners, but when he lights the balance of the 15 or 20 in the house, he does not get a good light, and, forgetting the cause, blames the poor quality of the light to the gas, when it is occasioned by lack of pressure.

Mr. Somerville—You have public schools in your city?

Mr. Gwynn—Yes, sir; but there is no reason why a man cannot regulate the pressure at the tip rather than by travelling into the cellar. It is more convenient to regulate it at the tip.

The President—I agree with Mr. Allen that gas companies are not as unpopular as they are assumed to be. I think, as far as our experience goes, not more than 2 or 3 per cent. of our consumers complain in a year. I think gas companies should study how to popularize the business in their communities, and it can be done in a great many ways, none of which is dishonorable. One point which the gas companies should watch closely is the character of the work they do on the streets, and in case of cuts they should take any care and expense to make the work good. Let no complaint come from any source as to the character of the work done on the streets. Gas companies generally have as directors men who stand high in their community, and I think the letterhead of every gas company should contain the names of its board of directors. They are generally men of standing and credit in their respective communities.

Mr. Boyle—I am unable to determine whether Mr. Allen's remarks are a criticism of the paper or a criticism of Mr. Cantine's remarks. The main object of the paper was to popularize gas companies, to point out whereby they might combat the prejudice that has grown up all over the country against corporations generally; gas companies are included within that class, because very few gas plants are owned by private individuals. I do not recall any sentiment in the paper that at all disparages gas companies, either their methods or their business.

Mr. Allen—I did not intend to criticize the paper, Mr. Boyle; but the President called on me to say something and I had to do it, and he didn't notify me ahead.

On motion of Mr. Cline a vote of thanks was tendered to Mr. Boyle.

The President—We will now listen to the paper by Dr. Howard Jones, President of the Light and Power Company, of Circleville, Ohio, on

THE JOINT BUSINESS OF GAS AND ELECTRIC LIGHT.

Mr. President and members: It is rather presumptuous in one like myself to appear in the role of instructor before gentlemen who have devoted their lives to the business of producing light, and are practical engineers, especially as the business of producing gas and electricity for light is known to me mostly in theory, and when studied at all, only as a pastime.

Yet it is within the memory of man when the gas industry of Ohio and other localities was in need of such facts as I have at my disposal, and I understand there are still some in the gas trade who desire *more light* when electrical matters are talked of.

In small towns the lighting is often divided between two or more companies, with the result of cutting down the dividends of the gas company and the electric company to a point where net profits sometimes cease to exist. It can be asserted without much danger of refutation that incandescent electric companies in small towns have seldom if ever earned a reasonable dividend. It is upon the desirability of combining the gas and electric interests of such towns, with a view of making each more profitable, that I wish to speak, and the specific figures which I shall present to you are given with a feeling that their correctness can be depended upon.

The town of Circleville, O., has been particularly favored by the electricians, and it is in this city that I have had the opportunity to study the various problems connected with arc lights for streets, and gas and incandescent electric lights for indoors. To persons with no knowledge of electricity, there is a mysticism about electric lighting which breeds respect. The qualifying word "wizard" was early attached to the inventor of Menlo Park. These facts, together with others that want of time forbids mentioning, created a halo around the promoters of the new light in its earliest days, which clung to them for years. The people, believing they were living in the greatest age the world had ever known, accepted all the advertisements of the haloed fraternity, and emptied their pockets into their coffers, hoping to receive in return enormous profits, because electricity was produced from nothing. Produced by simply turning a coil of wire between magnets.

The gas companies, "damned monopolies," were the great targets of these perpetual motion electric promoters, and the gas industry was partially paralyzed by the great wealth and the ill-nature it saw piled up against it. Then came reaction, and the clouds of bankruptcy here and

there obscured the halo. The new industry was found by investors to be a delusion and a money-losing investment of the first class. Investors in local companies, while cursing the gas monopoly as being next only to the imaginary Satan, had created by their generosity the greatest, meanest, "octopian" monopoly the United States or any other country every saw.

At places, the gas industry was damaged beyond repair, while citizens lost fortunes in opposition electric ventures. To day the varnish is off the toy, the child has grown to the man. The "wizard" business no longer catches capital. The gas companies are seldom mentioned by electricians as monopolies. It has been discovered that to succeed with the subtle electric fluid, the same business principles and sense must be used as in other undertakings. Upon the other hand, some of the opponents of the electrical enthusiasts are still bearing malice, are still prejudiced to the point of blindness. Now if I can show you the commercial relation which electricity to-day bears to gas, I shall feel that I have accomplished the purpose of your request.

Circleville has about 7,000 inhabitants. In 1859 a coal gas plant was established with gas at $5 per 1,000 cubic feet. This plant did a good business from the start, and in 1885, when the Edison people captured the town, was selling at $2.50 per 1,000 and earning good dividends. Early in 1886, a 1,000 Edison incandescent electric plant turned on its current under flying colors. Thirty-two stockholders were resident store-keepers and business men. At a public banquet 50 per cent. dividends were promised. At once the price of gas was dropped to $1 per 1,000 cubic feet, and the fight was on. The combat was one of capital and influence with a beautiful new invention, against a rich and cursed monopoly, with the result that each plant lost money. The Edison plant in two years had expended $55,000. In 1888 the two companies, seeing the fate ahead, combined, and raised the price of gas to $2 per 1,000 cubic feet, and the incandescent current to the same ratio. For two years the companies made money. In 1891 the gas contract for street lighting expired, and the citizens demanded arc lights. Each company decided to bid for the lighting, and, after considerable wrangling, the gas company obtained the contract to light 119 or more 1,200 candle power arcs for 10 years, at the rate of $75 each per year. The gas company at once began construction, and at the same time arranged for power for an alternating incandescent circuit. The price of gas was reduced to $1.50 per 1,000 to small consumers, and scaled down to 75 cents per 1,000, according to quantity and time of day of consumption. This resulted in the purchase, in February, 1892, of the Edison plant, by the former gas company, for a little over one-fifth of its cost. Its machinery was soon moved into the building of the arc plant, which was erected with an eye to the event, and now for two years and over, gas, and electricity for arc and incandescent light, have been furnished by one company from, practically, under one roof.

Without any material increase of population, the gas sales have reached a point where they are quite satisfactory. Only about 100 stoves are in operation. This field, we believe, has before it a promising future. Incandescent current is sold partly by meter and partly by contract, but after May of this year no more contracts will be made for more than 3 lamps, to a single individual. There is a great disposition on the part of citizens to have incandescent light in their dwellings and places of business. By meter the current sells at the rate of $1.60 for 10,000 Watts, or $1.60 for 100 milligrammes (Edison meter), but this small difference of 10 cents above the price of gas does not deter people from using it in preference. The simplicity, the convenience, the freedom from smoke, smell and dirt recommend it strongly to the modern housewife.

To be able to light up a closet, cellar, stable, or any room or place which you are about to enter, by simply turning a switch, is fully appreciated by this utilitarian age. The incandescent light is gaining slowly but surely over gas for illuminating purposes. To day this plant has over 2,100 sockets hung, running through 200 services. The number of gas meters for light is about 300. The comparative sales of incandescent current to gas are in ratio of 6 to 9, and I believe that before long it will be as 9 to 9. The profit upon the incandescent current is not large. In fact it is far from sufficient. In proportion to the capital invested in each, the incandescent plant earns 50 cents when the gas earns $1, but this estimate includes the profit from gas sold for heating as well as lighting. The lamps are sold to the customer at about cost.

The arc system in use is the Fort Wayne. Three machines of 50 arcs capacity each are run. They have given perfect satisfaction to the plant and to the city. No serious difficulty has been experienced with them. The lamps are the Wood double ratchet. Not more than one or two fail to start at a time, and frequently the entire 119 start up. There are 3 circuits of a combined length of nearly 20 miles. The earning capacity of this plant in proportion to the money invested is about equal to that of the gas plant or double that of the Edison plant.

If the arc plant were to run by itself it would not make money under our present contract. A few accidents would in fact make it a loser. Running all dark hours amounts to about 2,500 a year. In 1893 we ran 2,534 hours. Counting 1 arc in the engine room, we operated last year 120 arcs, consuming at a fair allowance 1 indicated steam horse power each, 2,534 hours. The number of arcs (120) multiplied by the number of hours (2,534) will give the horse power hours (304,080.) We used about 5 pounds of coal to develop each indicated horse power; this makes the total amount of coal for one year equal 760 tons, which at 90c. per ton, cost $684. Actually we do a little better than this. The other items of expense for one year, if the plant were isolated, are as follows:

Carbons	$600
Water	75
Oil and waste	70
Taxes	225
Insurance	150
Total	$1,120
Superintendent	$1,000
Engineer	720
Fireman	600
Two trimmers	1,080
Extra labor	400
Total labor	$3,800

The item of wear and tear has been variously estimated. Five per cent. of the cost of the plant seems to me a reasonable amount. Fifteen hundred dollars added for wear and tear brings the total expense for one year to $7,104. The income from 119 lamps at $75 each per year is $8,925. This leaves a balance in round numbers of $1,800 for net earnings, or 6 per cent. on the investment of $30,000. Evidently a very small interest, considering the doubtful condition of the undertaking. A single accident might wipe out several years profit. Such a plant combined with a gas and an incandescent electric plant will show better for the shareholders, and consequently it is of importance to every city to have such a combination, as this is their only hope for cheap light.

When run in combination the items given above are practically the same, with the exception of labor. In this department the cost is divided. There is, in addition to the labor enumerated, the salaries of the officials of the company, which must be borne in common. One-third the time of Superintendent, President, Secretary and Treasurer, amounting to $1,110, must be added to one-half time of engineer, $360; one-half time of fireman, $300; two trimmers, $780; one-half time of wiper, $180; extra labor, $480—making a total of labor of $3,210. To this add for coal, carbons and other items stated above, $1,804, and $1,500 for wear and tear, and we have a total of $6,514 as the cost for running for one year. This amount deducted from the income leaves $2,411 net, or 8 per cent. on the investment.

The Edison plant has about 2,100 sockets hung, and every night carries a maximum load of about 400 amperes, excepting during the holiday season, when this amount is considerably exceeded. We have a small engine and dynamos to carry the load during the latter part of the night and during the daytime. To run this plant by itself, one year with collections for the year of $6,000, costs as follows:

Superintendent	$1,000
Engineer	600
Fireman	480
Boy	360
Extra labor	360
Total	$2,800
Oil and waste	$70
Water	60
Tax and insurance	350
Wear and tear (6 per cent.)	1,500
Coal	500
Total	$2,480

Making the amount of $5,280, or net earning of $720. Valuing the plant at $25,000, its earning capacity is found to be about 2.9 per cent. These figures are upon a scale of strictest economy.

This same plant in combination with the arc light and gas can be operated one year, with the same output and the same income, for the following cost:

Supt., Prest., Sec. and Treas., one-third time	$1,110
Engineer, one-half time	360
Fireman, one-half time	300
Wiper, one-half time	180
Office man, one-half time	180
Part time of one trimmer	180
Extra labor	180
Total for labor	$2,490

Other items remaining the same as when plant was isolated ($?,480) makes total expense for one year $4,970. A net profit of $1,030, or 4 per cent. on the capital, $25,000.

This seems an inadequate interest for such a perishable investment, and so it is; but it is better by far than to have the incandescent plant in opposition hands. The item of depreciation has not been considered, except as it occurs under wear and tear. If in a series of years the arc or incandescent, or both, shall be displaced by something better, then, of course, dividends would be swallowed up.

If you are owner of a gas plant you may say: "Let the other fellow go into the incandescent electric light business. Let him lose his money. He will finally go out of the venture a wiser but sadder man." In fact, he will do nothing of the kind. Once in he will stay in. He will continually increase his income. He will enlarge his business in spite of you. Materials necessary to maintain the station are becoming cheaper and cheaper, and as time goes on the earnings of the station will be larger and larger, and finally the sale of incandescent light in small towns will equal if not exceed that of gas for illuminating purposes.

I shall not discuss the many reasons why incandescent electric lighting is financially a failure. Conditions are changing year by year, and ultimately it will become a commercial success. Electricians know that but few incandescent plants are profitable. Mr. George Cutter, of Chicago, recently said he did not know how to make private house incandescent lighting a money-making business. Yet I believe that within a few years, without the discovery of any new principle or new application of an old one, such lighting will be profitable. For small towns the direct current seems preferable to the alternating.

Gas men are well aware that 18 candle gas, burned in a common tip, is considerably better as an illuminant than the glow electric lamp, but the advantages of the glow lamp enumerated above, more than compensate, in the minds of many, for its inferiority in illuminating qualities.

In order to place incandescent electric light and gas light manufactured by one company upon the same dividend paying basis, the electric light should sell at about one-fourth higher price, light for light.

In regard to the annoyance of the two systems, we find more trouble in the production of gas than in the production of electricity. In other words, there is less trouble and worry, less constant vigilance required in running and maintaining electrical machinery than in manufacturing gas. The difference is not striking, because each requires skillful watchfulness to avoid errors and accidents; but there is a difference, and I believe it is against coal gas. It requires more learning and more training to maintain a constant supply of good coal gas, without mishaps or accidents, than to attain the same efficiency in the production of the electric current, either arc or incandescent.

We are not pushing one light upon the people and holding back the other. We are treating the public fairly in the matter and are supplying whichever is preferred. The gas furnished is seldom over 18 candle power, or under 16 candle power. We endeavor to have it 17. The voltage of the electric current is maintained to standard, and we aim to furnish long-life lamps. The entire condition is satisfactory to us. Consumers seem content with prices, and we feel that we have before us a future not all thorns. While our earnings are not at present such as would satisfy some investors, yet we feel assured of our position with the citizens, and hope always to deserve the same kind feeling which most of them now accord us.

Discussion.

The President—Gentlemen, this is a paper which I am sure will lead to discussion, and I hope it will be discussed as it deserves.

Mr. Wilkiemeyer—I have a very distinct recollection of the "banquet" the Doctor speaks of. We were neighbors at the time, and while the dividends of 50 per cent. were being declared, Mr. Edw. Moore, at that time President of the Gas Company—now at rest and peace—and I, walked down to the gas works and consoled each other. The Company I was with at that time was to be the next victim. Many of the prominent capitalists from my town attended the jollification. On the return journey I was twitted unmercifully, and among the many predictions made me was this: "Some fine morning I would view my gasholder dismantled, rusted and festooned with cobwebs." That holder is doing more service to-day than ever. The Electric Company, organized to benefit the citizens and to ruin the Gas Company, has gone into bankruptcy and is dead. It was in operation just 5 years, and the bondholders received 28 cents on the dollar at the final windup This paper of the Doctor's, with a paper read at the Milwaukee meeting of the Northwestern Electric Association, by Mr. Thom, should occupy the place of ready reference in every library of the gas and electric light man, and when the question of electric lighting confronts you for the first time, or you find your present capacity is taken up and one or two short-lived customers ask for one or two lamps, take these papers and read them well—but, for "the life of you," don't—don't tell an electric light promoter or supply man—*an expert*—what you are reading and thinking of, and if you are wise you will learn a very profitable lesson. Doctor, you now have the whole town to yourself, and if you are not making sufficient money, with your machinery all new and in excellent condition, what will you do when the apparatus is worn out, or when such improved appliances are brought into the market as will make your present outfit "behind the times," expensive and wasteful? You must either adopt the latest, or give local investment an opportunity to once more give you competition, with everything in favor of the new opposition. It is a most excellent thing to have the good will of the people. I thought I had it on several occasions, but in the morning it was quite different. We all know how evanescent this "good will" of the people is. When you imagine you are most secure, when you think you have the good wishes of every man, woman and child, along comes "municipal control," agitated by an electric light promoter. A little squib in your weekly or semi-weekly paper, and a fight is on your hands. Give me a good bank account—that, to my mind, is sweeter and will stay with you longer, provided you do not listen to an electric supply man—the expert. The "municipal control" question you must all confront sooner or later. Private corporations can no longer be formed in your city, which will empty their pockets into the vaults of manufacturers of electrical appliances and apparatus. Machines will be made and must be sold; you have all you need, and the only customer in sight is the city—and sell to it they will if they can; that is their business. You may imagine it is wrong; you are mistaken; it is their business to sell. There is no sympathy in business. I know from experience that the depreciation is rarely taken into calculation. This paper instances a $55,000 investment, which the Circleville Gas Company picked up for a little over one-fifth of its cost. In much less time than 10 years your boilers, engines, machines, and even the building, will show the depreciation, and when you get on the outside of your station your lines are bare, the insulation worn off, and you can readily count the poles which are 10 years old. My business training tells me the Circleville Company is selling its electric lamps at less than cost. Referring to pages 5, 6 and 7 of the paper. The plant isolated:

Coal	$684
Carbons, water, etc	1,120
Labor	3,800
Interest	1,800
Depreciation, 10 per cent	3,000
Total	$10,404
Income at $75 each lamp per year	8,925
Loss	$1,479

And no charges made for salary of officials or office help.

Run in combination, taking the distribution as given	$5,014
Interest	1,800
Depreciation	3,000
Total	$9,814
Income, at $75 each lamp	8,925
Loss	$889

Edison annexed isolated:

Labor	$2,800
Oils, water, etc	980
Interest	1,500
Depreciation	2,500
Salaries and office help	....
	$7,780
Income	6,000
Loss	$1,780

Edison annex in combination:

Distribution as given	$2,490
Other items	980
Interest	1,500
Depreciation	2,500
Total	$7,470
Income	6,000
Loss	$1,470

Casualty insurance, which in justice to yourselves and your employees, you must buy, has been overlooked. This will add a few more cents to every lamp sold. Depreciation and interest must be taken into consideration. It cannot be dodged. A gentleman representing one of the largest electrical manufacturers was in my office last Monday and made this assertion to me. When the stringent times came on, his company opened out its vaults and pulled out all the commercial paper, bonds, etc., they contained, and found the paper represented a value of $12,000,000. All this paper was sold for a little less than $4,000,000. This was depreciation with a vengeance, and this paper was secured by isolated electric plants throughout the country. I have in mind a company which values its electrical investments at $150,000; its actual investment in cool, hard cash, is the sum of $325,000. The difference between the valuation to-day and the actual cash expended, is the price of experience and depreciation; and experience and depreciation to day demand their pounds of flesh out of every dollar of your income, and the price at which you sell must include this depreciation, and you must have it in your vaults for the reckoning day, in cash. You can make an equal amount of money in the electric light business you are now making with your gas sales. It is simply a question of how much you must ask for the electric. That time must come. Do not imperil your investment by too long a wait. It is a poor consolation to call upon your friend, the gas works, at dividend-paying time and gaze upon the gasholder. The Doctor says, "In regard to the annoyance of the two systems, we find more trouble in the production of gas than in the production of electricity. In other words, there is less trouble and worry, less constant vigilance required, in running and maintaining electrical machinery than in manufacturing gas." I think the Doctor is in error. You distribute your electric current as it is made. Should the dynamo burn, get "niggered," the babbit melt out of your boxes, or the belt "fly off," every customer in the circuit is in darkness. Your stoker may rush the growler at midnight and fall asleep on the coal pile, but the gas flows along from the holder to the meter without interruption. In the morning, when you come to the works, you may be surprised to see the last rivet on the second last sheet slowly dive under water—the customer will never know it nor be inconvenienced—you'll be ready for all demands by evening. I know of many gas companies that made this combination of gas and electricity; some very few are well satisfied at present. The greater number are not. I am also acquainted with the officers of gas companies who are giving their entire attention to the gas business; they are always smiling and think they have chosen well. Time alone can teach us which is the better course to pursue. Gas, they tell us, is a "back number," yet we are doing better every year, selling a better gas at a lower price, and whether finally we sell gas for light, or heat and power, should be immaterial to the gas man. All that is necessary is a market for your product, and you will always have that, and that market you can enlarge each month and year. My friend Dr. Jones is unquestionably honest in the data he has given us, but, according to his own showing, not *one* of his ventures (except gas) is earning such a return as any provident merchant would have a right to expect—I mean demand—from the capital invested. In fact it seems to me that the worthy Doctor is relying too much on Providence for his dividend.

Mr. Cantine—Very much depends upon what kind or color of glass you look at things through. Now I think that Mr. Wilkiemeyer has been looking through blue glass. I am satisfied of it. He says he knows a company suffering a great depreciation, that has $325,000 invested and is barely able to get $150,000 out of that $325,000. He may be more intimately connected with that concern than you think. I don't know anything about it, but it makes a great deal of difference the kind of view from which you look at things. I am satisfied Mr. Wilkiemeyer has been looking through blue glass for quite a while. He did not formerly talk so. I often met him at these conventions. He was then Secretary, Superintendent and General Manager of the Portsmouth gas works. He had an electric light annex, and power was furnished by a gas engine, and he made the gas and turned it into electricity. I listened attentively to the Doctor's paper, and thought he made a very good showing. He does not expect any visitation of Divine Providence, or lightning, or thunder, or blizzards to strike him, and I don't think in that location there will be any cyclones coming along. He is taking such care of his apparatus that he does not expect to have any such depreciation. Ten per cent. for depreciation would look bad for the management. I am in about the same position as the Doctor, and I should hate very much to suffer all these things myself. You will find that almost all the business of the country, if you figure it on the same basis, will be exceedingly discouraging. We will have to take a little more charitable view. If we do not, hardly any industry would go at all. By care we are able to manage this thing all right. I very much doubt whether the gas consumption increases very much faster with us than electric light. We are able to use electric light, on the outskirts of the town, much cheaper than gas. And perhaps our recommendation has a good deal to do with it. We are asked which is the better to take. We use both. We are in the habit of telling the truth, once in a while, and we say generally that "gas is better for the ordinary consumer, and certainly for business, because a business house can be lighted better with good gas than with incandescent lights." I don't want to say anything to hurt Mr. Wilkiemeyer's feelings, because I think very highly of him, but I believe he is a little wrong on this matter.

Mr. Nash—My views have not changed very much for the last two or three years on this subject, and I think one, and the principal reason of the fact of dissatisfaction in the business of electric lighting is due to the electric light promoters themselves. If they would leave a man alone after he had a plant in operation, and give him a fair chance, he might be able to work along, and probably there would be something in it by very careful management. But I think in only exceptional cases is he left alone. In the majority of cases they will try to blackmail you by getting an opposition plant in, probably a municipal plant. The Doctor has put several "ifs" in his paper. A few accidents would make it a loser. It has to be run very closely, and, as I understand, there is no opposition. Is that so?

Dr. Jones—No opposition. We have the whole field.

Mr. Nash—You say a few accidents would make it a loser, and you figure on a scale of the strictest economy. You look very carefully after that. In anticipating the conditions as changing year after year, and ultimately becoming a commercial success, of course that is an anticipation, and very doubtful. I agree with Mr. Wilkiemeyer, in that I don't think the Doctor has figured enough for depreciation. He has figured a life of about 18 years. I don't think there will be very much of his original investment there in 18 years. I think 10 per cent. is as low as you can figure it. I know of a municipal plant put in something over three years ago. They were told that it would cost $5,000 to operate it, and $15,000 to install it. From the number of lamps they expected to run, it looked like a good thing. I must say for a municipal plant, it has been looked after very closely; but it has not come anywhere near what was claimed for it. In the first place, I don't think the lamps are over 1,000-candle power instead of 2,000, and they get 105 arc lights, instead of 150, as anticipated. I think that is about as near as you can depend upon the promoters. You can figure about 50 per cent. less than the representations made by the promoters. The man who put the plant in told me, a year and a half ago, that they were in the business of manufacturing electrical apparatus, and as long as they got plenty of these plants out, it didn't make much difference whether they made much on the first cost of the plant or not, that they had to come back for repairs. They burned out the first armature the other day, and the chairman of the light committee telegraphed on to find out how much it would cost to put in a spare one—he thought it would be wisdom to have an extra armature—and was told it would cost $450. He thought that was too expensive and left the circuit out for four or five nights.

Mr. McDonald—At the risk of having a great many people disagree with me, I do not think it is wise for gas men to lull themselves into security simply because their competitors are losing money. I do not think there is any question that every electric light company in the United States is losing money, unless the city is operating them. About 25 years elapsed between the organization of the first gas company and the payment of the first dividends. They experimented with leather gasholders, and all kinds of purifiers, wooden pipes, etc., sold gas for $6 a thousand, and sometimes $10, and there was nothing to compete with them other than oil at $1 a gallon and candles. Suppose the gas industry should come in now, in competition with coal oil and electric light, how much show would we have? On the other hand, there is no question that the difficulties that occur in electric lighting will in time, by ingenuity and skill, be overcome, except those difficulties which are inherent in all sorts of machinery. When that time comes they will

be able to furnish light cheaper than now; not because coal is cheaper or steam engines better, but because they are able to avoid accidents and breakdowns by experience. The question will finally come down to which is the best light, and when that time comes the people will ask themselves all these questions about dust and dirt on their ceilings, the heating of their rooms, the attracting of flies, and the deterioration of the atmosphere. These are all going to be considered and given their true weight, because no matter how slow people are to learn, they invariably learn in the end. If electricity is a better light than gas, it will finally supplant gas to a large extent anyhow, and it seems to me that the gas companies which are looking ahead far enough to provide for what is coming, although they may be losing some money now, are acting wisely. Not because electricity in its present development is a formidable competitor, but because they have no right to suppose a thing that is 15 years old is as big as it will ever grow.

Mr. Nash—Another question suggests itself. Why wouldn't it be just as well for gas companies—I suppose they are in the business to make money—to wait until it is perfected, until we get the best results of experimentation, and make their investment then?

Mr. McDonald—I think that is much the wiser course.

Mr. Miller—One fact Dr. Jones presented is that in the short time he has been operating his electric light customers have grown to have a ratio of six to nine of the gas customers. That is a plain fact despite the theorizing and figuring on what might be. The question is, How are we going to account for the rapid growth? The Doctor starts out by saying that electricity—that his electricty is better than gas, and there comes that question that Mr. Allen speaks of, "If a gas company starts out by saying that it is unpopular, it will be unpopular." One of our far southern cities that I visited last summer had an electric plant and a gas plant. The electric plant was growing at an enormous rate, and the gas business had fallen from 35 million to 15 million. I asked why it was, and they said although they pushed the gas business and held back on the electric light business, because they knew the money was in the gas business, the climatic conditions were against them, and the people would not use gas because they had a summer nine months out of the year. Well, I took that and half believed it, until I went to a town about 40 miles away. In that town the gas company was running entirely independent. While this company that I spoke of was losing, the other was gaining at the rate of 17 per cent. a year. I asked them about the other company, and they said, "Yes; but although they were running both, their chief interest was in the electric light business, hence they were pushing the electric light and holding back the gas, as they thought the electric light was better suited to the climate." The first company acknowledged that they were not making much on the gas business because it had gone all to pieces, and the electric plant was not paying. Now this gas plant, that was gaining 17 per cent. a year, was making a large percentage on the investment. Mr. McDonald raised the point about the infancy of the electric light industry, but the brightest minds in this country, and in the world, have been working on electricity for the last 15 years. When the gas business first started the scientific men made fun of it. Sir Humphrey Davy made a remark about using the dome of St. Paul's cathedral for a gasholder, and all that sort of thing. On the contrary, the brightest minds have been rubbing up against the electric light subject. In a lecture by Prof. Thompson, published in *Engineering* of the 15th and 22d of last January, he says there is very little hope for improvement in electrical machinery, and there are very few electrical engineers more enthusiastic than he; that the efficiency of the dynamo is 95 to 97 per cent., and the efficiency of the converter is above 95 per cent.; so it comes down to the lamp; but Prof. Thompson says there is very little chance for improvement in the incandescent lamp. Almost every substance imaginable has been tried for the filament, and nothing has been found that will be at all satisfactory except carbon, and the efficiency of the lamp is therefore limited to the vitality of the carbon. If any scheme is found to get electricity directly from heat, without the intervention of the steam engine, of course the gas company is going and the steam engine with it. It is going to upset the whole industrial system. If that comes it is bound to get rid of all steam engines, and all gas companies, and change all power; even water power won't be able to compete with it under most conditions. This is a consideration we can hardly figure on now. But I do say, this talk of electricity being in its infancy has very little in it. Electricity is in its perfect state of development to day. More money, time and study have been put on electricity than on gas, and if all gas people would put but a fraction of the time and money on improving their business that the electric light men do they would be far in advance of what they are.

Mr. McDonald—I am not well enough posted to discuss electricity; but about 15 years ago I went as junior draughtsman in a locomotive works, and the old, gray haired man in charge told me how he built locomotives in Stevenson's time. He told me how they had advanced. We looked at the giants we were building out in the shops and thought we were very great men. This summer engines were built which will run and do double the amount of work, and with less than half the coal, than we thought possible. It was not one particular man who did that—a draughtsman here and a mechanic there who found out something that made an improvement. It is in the improvement of details that I look for the cheapening of this light. I will ask Mr. Miller how any person would find out, from experience, whether or not anything in the electric business would last for 20 years? Nothing has been put up in that business that has been in use 20 years. It is only a long time experience which will teach managers and engineers to pick out devices that will last a long time and run smoothly and not wear out.

Mr. Miller—Mr. McDonald has compared the electric light business to locomotives. Locomotives increased in efficiency 100 per cent. in a comparatively short time. He, I suppose, reasons from that that electricity is going to do it. If that is so we may have perpetual motion. The point I made was that electrical machinery was nearly perfect as regards efficiency and mechanical details. As far as repairs are concerned, that is not going to make the difference. We must acknowledge that there is some depreciation. When we allow 10 per cent. depreciation, there are very few companies making anything, and a great many of them losing. The poles and lines are going to have nearly that depreciation. When it comes to the dynamos, which is the question that Mr. McDonald is working on, the saving is going to be very small comparatively. On all the machinery, except the dynamos and on the lines and poles, we know very well what the depreciation is now from the experience on other lines.

Mr. Cantine—Very much has been said about the depreciation of electrical machinery, yet we know that in all gas apparatus there is a very great depreciation going on. The life of the holder is not forever. I see Mr. Butterworth, just prior to the meeting of this Association, has had his holders all painted up bright and red; nevertheless, they will give out in time. The meters are going to pieces fast enough to keep 15 or 20 meter manufacturers in good order. They always meet with us, and always have plenty of money to pay their fare and hotel bills, and we have to contribute that. The exhauster wears out in time and you have to buy a new one. The retorts have to be set once in two years—a man is a pretty good one who gets more than two years out of a retort. All these things seem to require a great deal of repair. The next great trouble is that the trolley lines are destroying our mains. I don't know whether they are injuring those of other persons, but I am pretty well satisfied they are ours. Unless you get some other means of returning that current, except through our mains, it will destroy them. I believe we carry back about all the return current, and don't believe the ground is doing very much in that line. We are continually tearing up the pavement and fixing the mains, and what was a pretty good 6 inch pipe does not seem to have much iron about it any more. It won't bear any tapping; it is tapping itself. We have to look at all these things, so it seems to me there is about as much depreciation on one side as on the other.

Mr. Allen—One thing I admire about these electric light and machinery people is their enthusiasm. I have heard them say "an incandescent light was as good as a gas burner and made as much light, and the gas man has not cheek enough to say it isn't so." This world is coming, more and more, to be run by specialists. Electric men will claim everything that is loose, and I admire it in them. It is a good point. But I say we can learn a good deal from that line of doing business. We frequently hear about the improvement we are going to have in the way of electric lighting. It is very seldom, however, that I have heard anything said about improvement in the gas business, but there has been considerable improvement in this instance. It seems to me that all the bright intellects are not in the electric light business. We have some men in the gas business whose heads are pretty good; in fact, there are men in the gas business who are as smart as anybody. It seems to me that for a long while gas people had things considerably their own way and were making a fair interest on their investment, and were getting their salaries and dividends pretty regularly and taking life right comfortably as a whole. That is all right—no objection to that—but it seems when an occasion comes for active work the gas people are not going to sit quiet. It seems to me that in the few years that I have been about a gas works, I can discover a big improvement in the gas made and in gas appliances. That light there (indicating) a few years ago we could not get.

The President—That is 20-candle gas (laughter).

Mr. Allen—There is some room for improvement, it seems to me. So far as the Doctor's figures are concerned on electric light, I am a little muddled. I heard of a company in the northwestern part of the State he other day that was going to install an electric light plant, and I don't think it expects to pay over 30 per cent. dividends, but it proposes to furnish arc lights at $4.50 a month, and incandescent lights at 40 cents a month, and run them as long as you please. Now, it must be profitable, because the gentleman who is most active in the thing has always been a fireman on a steamboat, *and he ought to know what he is talking about.*

Mr. Nash—I would say, in reply to what Mr. Cantine said respecting depreciation in gas works, I think we have been running gas works long enough to know and allow for the ordinary depreciation. We know what it costs to keep meters in repair and renewed. On the contrary, in the electric light business, for the reason that it has been running a comparatively short time, it is uncertain what the depreciation will be. I was reminded by what Mr. McDonald said, speaking of the locomotive, that I suppose there has been fully as much improvement in the stationary engine as in the locomotive in the last 10 or 12 years.

Mr. Gwynn—I am glad to see this class of papers gradually creeping into our annual meetings, for the reason that about 33 per cent. of the gas companies are now operating electric light stations in connection with their gas plants, and I think we can all gain a few points in the discussion of these papers. I cannot agree with the Doctor exactly on all the points, and on one especially, which is that electric light plants are a great deal easier and nicer to handle than gas works. I think the Doctor is favored by no great amount of telephone, electric fire alarm, telegraph and street railway lines or things of that nature, which is a great help to him. Where a town has a good sized telephone exchange and fire alarm system and a storm sets in at night, the first thing the Manager gets a call from the Chief of the Fire Department, saying your line is down on him, or he is down on you, and that your current is burning up his call boxes and damaging his entire electric fire alarm system. You no sooner get that fixed than the telephone manager gives you a similar call, and he is no sooner gone than your night crew at the plant call you up and say they have a ground or a short circuit, and you have to test and try your different circuits and find that the telephone line or fire alarm has dropped on you and that you have a short circuit or a ground. A few things of this kind are turning up continually in cities; more so in large cities than in the smaller ones. The less telegraph, telephone and fire alarm wire you have to contend with the better you are off. In the larger cities you have a great deal of trouble in stormy weather. A storm comes up after you go home and some customer calls you up to say his lights have gone out, and the consequence is that a fuse has burned out or something has gone wrong, and they want you to send right away and have it fixed, because they have no lamps or gas in readiness for use. All these things arise in electric light business that you don't have to contend with in the gas business. If a gas plant is in order I think it is easier handled than an electric light plant. I would rather handle three gas works than one electric light plant. As to the profits of the business, I think the Doctor has been favored considerably by a remarkably fair city contract. A contract to operate a 300-Watt lamp, 2,500 hours (or what has formerly been known as a 1,200-candle power arc lamp) at $75 per annum, I consider a fair price. But few electric companies are favored with as fair a city contract as the one which the Doctor refers to in his paper. If the Circleville plant, in which the Doctor is interested, was only receiving $75 per annum for 1,200 candle power lamps, running all night and every night, or 4,000 hours, the same as a large percentage of electric plants are now compelled to operate their street circuits, the net profits of $1,800 shown by the Doctor would be materially reduced, as the increased cost of fuel and carbons alone would wipe out $765, to say nothing of the increase in salaries and various other expenses, owing to the additional hours the plant would be operated; or, in other words, would leave a net earning of about 3 per cent. Again, a great many plants are running under city contracts which compel them to furnish a 450-Watt lamp (or what is known as a 2,000-candle power arc lamp) for $75 per annum, to be run all night and every night, or about 4,000 hours per year. A company running under a contract of this kind would consume enough additional fuel and carbons, based on the Doctor's estimate of cost of same, to wipe out three-fifths of the net earnings shown by the Doctor. Add to the cost of the above items, the extra cost of labor and wear in general and the Doctor's entire profits would be wiped out and a small balance shown on the wrong side of the ledger. It is only due to the fair contract, as I stated above, that the Doctor's Company has been favored with that enables him to show a dollar's profit in the arc lighting department of his Company. In reference to the general depreciation in value, I think the Doctor is a little low. I cannot agree with some that the depreciation would amount to 10 per cent. I think about 7 or 8 per cent. would be a fair estimate. In talking with the Superintendent of Construction of the Western Union Telegraph Company, he stated to me that the average life of good, white cedar poles was 15 years in their business. The best grade of wire to-day I do not think will have an average life exceeding 10 years, and a great deal won't reach that. I have seen the covering peel off and new line wire required inside of 5 years. But there is considerable rebate in re-lining a town, so far as the wire is concerned, because the old copper will average about half the cost of new wire. It is pretty hard to get at the exact life of dynamos and the various electrical appliances in a central station, as they give out at times rapidly. The principal things that give out are the armatures and fields, which are continually giving out. You have to rewind them, and when an armature or field is re-wound it is as good as new. The cast framework of the machine depreciates slowly. It is the same with the engines. Of course, the principal parts that give out are the cylinders, journals, etc. So I think 7 or 8 per cent. on an average, including building, switchboards, etc., would be a fair depreciation. In regard to the dynamo efficiency Mr. Miller speaks of, that at the present time is about 97.5 per cent., and the only improvement that you can look for in dynamos is in the mechanical construction, making them more substantial by better ventilation of the armature, etc. It is the only thing you can look for in the line of improvements, as the efficiency is nearly perfect.

Mr. Faben—In the matter of depreciation suggested by the gentleman from Steubenville, of course when you re-wind an armature all you save is the frame. I doubt if you could save half of the additional cost of wire in re-wiring a town. I have among my acquaintances a gentleman who is interested in the management of a number of gas and electric light concerns in this country, known to us all as a good calculator and business man, who is just as strongly as ever interested in the one question of how he can run an electric plant and make any money. He says: "I charge about 30 per cent. more for electric light than for gas. If a man is employed because of the electric company, the electric company must pay him. If he does work for the gas company, the gas company pays him and the electric company don't; and the question in my mind is to-day, how can I make that pay?" Now, if that is the experience of a recognized, good business manager, what must be the experience of a small concern where the actual management must devolve on low-priced men, and certainly good talent is not obtained at low prices.

Mr. Gwynn—I do not wish to be understood as saying that there is money in the business, for money does not exist in the electric light business to day. Out of about 2,300 central stations I will say that not to exceed 100 can show a dividend.

The President—Dr. Jones, you should have an opportunity to close the discussion, I think.

Dr. Jones—Gentlemen, this is my first experience here, and I expected some kind of initiation. I expected to be figuratively tossed in a blanket until some fellow let go the end of it. I am glad Mr. Wilkiemeyer went over my paper carefully and prepared an article to answer it, because what he said was not on the spur of the moment, for he brought forward every argument he could as a gas man. Now, I came very nearly taking Mr. Wilkiemeyer's advice once, when he was in the electric light business. He advised me to put in a gas engine, and if I had I might have had his experience. Whether that is true or not I don't know. But he was in the electric light business long enough, perhaps, to get his fingers burned. It is not safe to give a sharp knife to a boy in any case, and every boy will sooner or later make the blood come. There is a great deal of difference in the way you handle a tool, whether a knife or not. While I believe Mr. Wilkiemeyer's figures are perhaps the result of his experiments, yet I believe they are absolutely wrong and incorrect. I am not an electric light man primarily. I have been engaged in the gas business (and my interests were in that) eight or ten years before I had anything to do with the electric light business, and I had the third electric light plant in Ohio to fight. When you say I have to build a plant every 10 years I know it is not true, because I have one that has run 10 years, and it is as good as it was 10 years ago, practically. We have a plant that been in business 10 years, and when another gentleman says that the life of a plant is 18 years, show me a plant that has been running 18 years. I don't know one. If there is, that might be the life of it; but I don't think they go back that far. Now it is not in 10 years or 18 years that you have to rebuild, and no person knows how long it will be. That depends upon the care it receives from year to year and from day to day, and the climate you are in, and it won't do to console ourselves as gas men that the electric light plants will go to pieces in 10 years, for we know that they don't go to pieces in 10 years. A good many things have been intimated here, and I am sorry they have not been brought out as they might. I am satisfied that as gas men you have not got at the bottom of the business at all. If you have a town without an electric light company you may be perfectly satisfied to run along and never have any. I certainly should be. But if you are in a town where there is such a company, it behooves you to determine what to do, and you need not console yourself with what has been done in the past. I want to say right here that I believe in our plant we have the perfection of electrical machinery. I don't believe there will be any particular advance in it. Perhaps there may be some little mechanical advancement, but I believe that, without you discover some new principle or some new application of an old one, you have the ultimatum of the manufacture and sale of electric current to-day as much as in the gas business. Some of these gentlemen speak of the gas industry as if nothing were ever done in that direction. Perhaps the water gas promoter has not been in his town; but he will be there and make gas for 14 cents a 1,000, or 10 cents a 1,000, or something like that. In 1875 the gas business in the United States and in the world

sat down and folded its arms and felt secure. From 1875 to 1884, a period of 9 years, with a population of 5,500, with only an increase of 1,000 in 20 years or more in Circleville (it is an old fashioned town), the output every year was about 5,000,000 cubic feet. It varied not more in any year than 300,000 cubic feet. In May, the day the Edison plant turned its wheels for the first time, the average output was approximately 5,000,000 cubic feet, and 1¼ million cubic feet of that went for street lighting purposes, and they had not less leakage than perhaps a million cubic feet a year—the leakage was great, for they had old wooden pipes. Now I have the figures for the next 10 years. To go back a little bit, during the 5 years preceding the electric light plant being put in operation for illuminating purposes, only 19 million cubic feet of gas were put out in the city. In the 5 years following that, from '83 to '88, right during the period of the incandescent light, 55 million cubic feet were put out, which was accounted for from the fact largely that the price of gas dropped from $2.50 to $1. In the next 5 years, that is from '88 to '93, 41 million cubic feet were sent out, with no street lighting. In two years—'92 and '93—without any street lighting at all, we put out more gas than in the 5 years preceding the advent of electric light, which shows that the gas interest in Circleville has not been neglected. We have a combined plant, and we make coal gas until we cannot sell our coke any longer, and then we make water gas. I have said in this paper that a good gas flame is better than an incandescent light, and I believe it. But the people don't believe it, and they are not going to have it. Now about the wear and tear. I know something about that, and I am here to say to you that the wear and tear of the electric light plant in our town is less than the wear and tear upon the gas plant. Talking about armatures. We have machines that have run 10 years constantly, and only once an armature burnt out. If we burn an armature it costs $60 to replace it—to rewind it—and one only has burned out in 10 years. If we burn out one of our 3 arc dynamos, we can get it rewound for something like $175. We have not burned any in two years. Now, so far as the engine is concerned, I believe our engine is as good to-day as when set, 10 years ago. Of course, we have made some repairs, but it was a small cost, and so far as the wear and tear of the line is concerned, we have a line that has been up 10 years, and we know it is in good condition to-day, and so far as the wires being down—the fire alarm system is on the same line of poles, that was part of the franchise—that has never occurred to an arc line, nor an incandescent line either. We don't put them up that way. So the secret of success in the the electric light plant is the way in which you do it—the way in which you run it, and the way in which you maintain it. About the boilers. We have a boiler that has been in 10 years. It was overhauled and new tubes put in the second time in ten years, at a cost of a few hundred dollars. If it does not run 5 or 10 years more there is nothing to be learned from past experience. We have never had a hot box on our arc light dynamos. If you do get them there is something wrong. There is just exactly where the trouble comes in, in managing an electric light plant. I say, in all honesty and in all candor, from an observation of 10 years in the gas business and two years in the electric light business, that I would rather run an electric light business than run a coal or water gas business. Our street light circuit was out but once. We don't have belts slipping off, and we don't have this and that little annoyance which people are constantly complaining of in a gas convention. You don't hear those things complained of in electric light conventions, because I believe, as a rule, gas men don't make good electricians. I went into it prejudiced against it.

The President—What would be the effect of charging enough to make 6 per cent. instead of 2.9 per cent.

Dr. Jones—You might ask when the electric light business grows to the same proportion of the gas business, what would it be? I will say it will be then as much as the gas business. Every new house that is built wants the incandescent light; and while it stands in the ratio of 6 to 9 now, yet in a few years it will be 9 to 9. We have a capacity to make it 9 to 9 with our plant. We have a capacity for 30 more arcs.

Mr. Wilkiemeyer—What part of your plant is 10 years old?

Dr. Jones—The incandescent.

Mr. Wilkiemeyer—How much are you making on it?

Dr. Jones—I have figured on it to make 4 per cent.

Mr. Wilkiemeyer—What became of the difference between $55,000 and $25,000?

Dr. Jones—That was lost by the original promoters, who were fooled by the electric promoters, who are a class of men you don't want very much to do with.

Mr. Miller—That was not depreciation.

Dr. Jones—Unquestionably. But the gas company depreciated also.

Mr. Shelton—Did your gas supply ever give out?

Dr. Jones—Yes, sir; once.

Mr. Shelton—Did your electric light?

Dr. Jones—No, sir; I think not. There have been times when we would have to shift from one engine to another, and be out for a few minutes, but only once or twice in two years.

Mr. Shelton—I think it is the exception that the gas supply ever gives out.

Dr. Jones—I know. But it has given out.

Mr. Gwynn—What is the reason of its giving out?

Dr. Jones—Because the gas works were not equal to the holiday business of 1892. Now I am not trying to array one of these interests against the other. I am trying to show you the perfection of both of them, and if I have not done that, it is because I have not the ability to do it in the short time allotted me.

Mr. Wilkiemeyer—The little talk I made was from the experience of 10 years. We built our plant in 1882. We have an engine we would like to sell to day. I am not prejudiced against electricity from this very fact, that we are getting $154 a year for 2,000-candle power, moonlight schedule. You can make money in the electrical department, providing you get your price. You are making 2.9 per cent. on your incandescent lights and 4 per cent. on your arc lights. It is not fair to your stockholders. Bring your price up and then see what gas will be.

Dr. Jones—Mr. Wilkiemeyer, you speak about raising the price. Now it is not for any gentleman to say what should be done in any given place, because there are always surrounding conditions which no man outside of the town can understand.

Mr. Nash—I think the Doctor is very favorably situated. He can charge exactly what he wishes to charge—at present, any way—and he undoubtedly has a very well constructed plant or he would have had more trouble with it. I think his experience is rather exceptional.

Mr. Faben—I have never had the pleasure of an introduction to the Doctor. I am one of that kind, however, who regards an introduction as unnecessary if you both speak the same language. He speaks of electric companies not having the difficulties that are discussed in gas conventions. I do not remember of having seen the Doctor at a national electrical light association meeting, and the papers that are read there are certainly not papers that would call for the kind of discussion that we have in our little meetings. He should hear the discussions that go on in the corridors of the hotels, and the way they pour out their griefs there. There is the man with a splendid overhead construction who says, "I am threatened with having to put every one of my wires under ground, and I don't know what I am going to do. The men who have their wires under ground pay $1,000 per year rental per mile of circuit." It is not a question can you now afford to put your wires under ground; if the wires must go underground the companies can put them there. It is a question of whether the community requires them or whether they can pay the price. The companies are public servants. It is not a question whether the companies are ready and willing, but it is a question whether the community can pay.

Dr. Jones—In reply to the gentleman I would say that the remarks in my paper and the remarks made here I do not make for universal application, because I have not any experience outside of one particular town, and everything I have said applies to that town; it goes no further from home than that. I am not drawing an inference as to what may or may not be done in other places.

Mr. Gwynn—The Doctor referred to having little trouble with his arc system, but I noticed later on in his talk that he said he had several open circuits. I want to say that he will probably find, in a few years more, that he will have more open circuits than he has had, and they will continue to increase as the wires get older. They get crystallized and break, and he will have more trouble. He is only two years old with his arc circuit.

Dr. Jones—We have had the other plant 10 years.

Mr. Gwynn—Yes; but there is not so much trouble with them as with the others.

A Member—I think we ought to thank the Doctor for the sincerity of his belief and for the good words he has spoken for the gas industry. While we may differ on our theology, I think we ought not to overlook the fairness of the Doctor in his treatment of the subject.

The question then coming upon the motion of Mr. Penn, to return a vote of thanks to Dr. Jones for his paper, it prevailed unanimously.

The President—Gentlemen, like a good provider, we have some desert—we have saved something good for the afternoon in Mr. McDonald's paper. I want you all to stay for that. This session is now adjourned to 2 P. M.

(To be continued.)

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

At the annual meeting of the Consumers' Gas Company, of Newburgh, N. Y., the following officers were chosen: Directors, John C. Adams, B. J. McDonald, Henry Baumgardner, Joseph H. Berry and O. H. Lawrence; President, John C. Adams; Vice-President, Jos. H. Berry; Secretary and Treasurer, B. J. McDonald.

Mr. Henry Glass, a member of the Philadelphia Gas Trust, when the Philadelphia Gas works were controlled by a Board, so named, died at his home in that city on the evening of the 3d inst. Deceased, who for many years was active in the local politics of Philadelphia, was born in Petersburg, Va., in 1819, and became a resident of Philadelphia in 1863. He served on the Philadelphia City Councils for a term of 15 years (1871 to 1886), and was well known amongst the hotel keepers of the city, having been for years proprietor of the hostelry called the Old Drove Yard Hotel.

At the annual meeting of the Plainfield (N. J.) Gas Company the following Board of Directors were chosen: Henry G. Runkle, E. R. Pope, A. J. Bronson, William Runkle, and E. G. Pope.

At the foreclosure sale, brought by the holders of the second mortgage bonds amounting to $160,000, the plant and fixtures of the Memphis (Tenn.) Gas Light Company were bought in by Mr. T. K. Riddick, at his bid of $125,000.

Early this month the Governor of Pennsylvania received the third annual report of J. W. Patterson, inspector of illuminating gas and gas meters for Allegheny County. It shows that $3,621,700 is invested

in the illuminating gas business in the county, and that last year 1,364,514,535 cubic feet of gas were supplied. The number of consumers was 21,405, an increase, as compared with the previous year, of 1,240. The candle power or illuminating value has been increased on the average 5 per cent. above the legal requirement, and no complaint was made to the Inspector during the year as to the quality of the gas. The report discusses at length the difference in price of electric light and that produced by illuminating gas to demonstrate that the latter is much the cheaper, the Inspector claiming that the electric light costs 100 per cent. more than gas, and at its best 20 per cent. less light. "When it is considered," says the Inspector, "that the illuminating power of gas is not variable, while electric light is affected by the slightest change in pressure, we may safely say that the gas does not cost more than one-fourth as much as electric light." There were examined during the year 2,220 meters, of which 1,158 were new, 593 repaired, and 64 contested. Eighteen new meters were declared fast and 3 slow, while 6 were rejected. Of the repaired meters 71 were fast, 17 slow, and 27 were rejected. Thirty-six of the 64 contested meters were fast and 21 slow. The average price for gas was $1.09 per 1,000 cubic feet and the number of miles of gas mains in use is 317.48. The 11 companies in the county paid into the office of the Inspector last year $4,126, of which $2,500 represented the salary of the Inspector, $900 was paid out on account of help, and rent took $400.

THE Fishkill and Matteawan Gas Light Company, of Fishkill, N. Y., has been reorganized. It is hereafter to be known as the Light, Heat and Power Comany, of Fishkill and Matteawan, and the capital has been placed at $40,000. The Directors are: William D. Haven, of Trenton, N. J.; Wm. R. Schofield and Wm. W. Silkworth, of Fishkill Landing; A. M. Sutherland, of Orange, N. J.; and Theron G. Strong, of Bayshore, L. I. We understand that the works are to be reconstructed after which the selling rate is to be reduced to $1.50 per 1,000.

THE Directors of the Mount Holly (N. J.) Gas Light Company chosen at the annual meeting held this month, are: W. Budd Deacon, John Semple, John S. Frick, Charles W. Brown, and Henry C. Risdon.

THE Board of Aldermen of Chelsea, Mass., have voted "leave to withdraw" to the projectors of the Chelsea Illuminating and Fuel Gas Company, which concern was also known as the Champlin-Babson Company.

MR. J. TAYLOR ELLYSON, Mayor of Richmond, Va., in his annual report to the City Council has the following to say respecting the City Gas Works: "The gas works, under the excellent management of Superintendent W. C. Adams, continue to be a source of profit to the city. The excess of receipts over expenditures was $399,480.81, to which we add $31,929.80 for gas consumed by the street lamps and in public buildings, we have a balance in favor of the gas works of $71,868.11. We have now more than 69 miles of street mains, and 1,642 street lamps. We have put in during the year for new consumers 372 service pipes and renewed and repaired 302 others. The improvements during the year consist of the water gas plant of 700,000 cubic feet daily capacity, which was erected at a cost of $25,000; 2,417 feet of main pipe, and one relief holder of 40,000 cubic feet capacity. The Superintendent reports that the water gas plant is working to his entire satisfaction, and that the daily make of gas from it has far exceeded the guarantee of the contractor. The saving to the city from this plant as well as to the consumer has already been demonstrated, and the saving in the cost of the manufacture of gas will be so great that before the end of the present year it will be evident to all that this investment was most judicious and profitable. An appropriation of $35,000 has recently been made for increasing the purifying capacity of the works. This is a much needed improvement and will, when completed, add greatly to the efficiency of the plant."

THE proprietors of the Peoria (Ills.) Gas Light and Coke Company have awarded the contracts for the construction of two storage holders to the Stacey Manufacturing Company, of Cincinnati, O. They have also authorized the North Bend (O.) Coal Company to deliver 12,000 tons of Pittsburgh coal on the works during the ensuing year.

WE regret to report the death of Harriet Habberton, wife of Mr. S. F. Gold, Superintendent of the Bergen County Gas Light Company, of Englewood, N. J. Deceased was a sister of John Habberton, the celebrated author.

"OBSERVER" informs us of the death, by his own hand, on the morning of the 6th inst., of Mr. Thomas J. Pishon, formerly well known to the fraternity as Superintendent of the Roxbury (Mass.) Gas Light Company. Deceased, who was in his 73d year, had been suffering from melancholia for some time, although his relatives at no time thought the disease was sufficiently pronounced to cause his incarceration in an asylum.

THE Charlestown (Mass.) Gas and Electric Company will build a gasholder this season on the rear of the site on Arlington avenue. It will be of the single-lift order, of the dimension of 72 feet by 26 feet.

A BRIEF announcement is printed above respecting a foreclosure sale of the Memphis (Tenn.) Gas Light Company, and since that was written we have received the following additional particulars, furnished by a local correspondent: "The shareholders of the Memphis Gas Light Company were wiped out, on the 2d inst., by a public sale of the works, the plant, the goodwill, and the entire property, under a foreclosure through default of interest on the second mortgage bonds, of which $160,000 were issued in 1892. The sale was made by L. E. Lehman for the Trustees, and the property was bid in by Mr. T. K. Riddick for $125,000 for account of the holders of the second mortgage bonds, among whom are Messrs. N. Hill, T. K. Riddick, W. A. Williamson, J. W. Bailey, the German, Continental, Memphis City and Manhattan Banks. The purchasers were previously stockholders and directors in the old Company, and shortly after the sale they met in the parlor of the First National Bank and organized the New Memphis Gas Light Company, in which the Directors are: N. M. Jones, John M. Peters, C. F. M. Niles, T. K. Riddick, Napoleon Hill, John T. Frost and John W. Bailey. The temporary officers chosen were: President, N. M. Jones; Secretary, D. F. Jett; Attorney, T. K. Riddick. Nothing definite as to the capitalization of the Company was decided upon, and it is not at all improbable that negotiations looking to a consolidation with the Equitable Gas Light Company, of Memphis, will be opened. The amount of capital stock wiped out by the foreclosure is $750,000. There are many confessed judgments against the Company."

A SUIT was instituted some days ago against the city of Philadelphia by Peter Nolan, who asserts that on Feb. 8th last an employee of the Gas Bureau entered his house, 329 North 9th street, and removed the gas meter from the cellar, but neglected to turn off the flow of gas, in consequence of which his wife and child became sick, and he was unable to carry on his business for want of light. He says that his gas bill was paid up to date, and that an investigation disclosed that the meter had been removed by mistake, another houseowner in the neighborhood having been the delinquent.

FROM the annual report of Mr. O'Shea, Superintendent of Lamps, Boston, Mass., covering the operations of the department for the year ended Jan. 31, 1894, we learn that the city maintained 8,764 gas lamps, automatically regulated to consume 4 cubic feet per hour. The naphtha lamps number 2,803, and are maintained by the Rising Sun Street Lighting Company, at the contract price of $21 per lamp per annum. In respect of electric lights, of which there are 1,580, the Superintendent says: "It is quite possible that this department, with the co operation of the department of parks and public grounds, will be able to reach the maximum number of lights * * * before the end of the present year, and by so doing obtain the same at the minimum price (35 cents). This arrangement will save to the city more than $28,000 annually on the present number of lights, and will enable this department to light by electricity many of the main arteries of travel which are now poorly lighted by other means." The total expenditure for the year was $572,293.70, of which $225,776 82 was for electric lighting, $169,919 for gas, $92,462 for lighting and care, $59,464.79 for naphtha lighting, $9,069.83 for repairing lanterns, $6,200 for salaries, $3,428.73 for underground work, $1,405.55 for electric light construction, and the balance for supplies, etc.

THE Addicks syndicate is making play for possession of the Philadelphia municipal gas works, and offers the city $20,000,000 for the plant, good will, and so on. The Councilmen, however, are not disposed to part with the works, which would certainly be a rare bargain at the figure named, even though the entire establishment is admittedly in a wretched "physical condition." In furtherance of the attempted purchase Mr. Addicks has filed a charter of incorporation for a concern to be known as the City Gas Company, of Philadelphia, with an initial capital of $5,000, reserving the right, however, under the general law, to increase the stock to $30,000,000. The incorporators returned are: C. B. Taylor, R. R. Taylor and E. C. Taylor, of 2129 Pine street; S. D. Morrell, of 408 South 22d street, and C. V. Grant, of 1026 Spruce street, all of Philadelphia.

MR. HENRY MAGUIRE, Supt. of the East St. Louis (Ills.) gas works, writing under date of the 8th inst., says: "Tomorrow we will begin the work of laying 2 miles of 6 inch cast iron pipe. The contract for pipe and specials was awarded to the South Pittsburg Pipe Works, of South Pittsburg, Tenn. Business is looking up in our neck of the woods."

THE annual meeting of the Montreal Gas Company, which was held on the 5th inst., was very largely attended and was notable for the fact that the ticket proposed by the Directors to fill vacancies on the Board caused by the ending of the terms of five of its membership, was defeated, this defeat, of course, meaning the retirement from the Presidency of the Company of Mr. Jesse Joseph, who had occupied that position since 1877. The coming man is Herbert S. Holt, a railroad engineer of much prominence in Canada, wherefore we presume the vacancy in the position of engineer to the Company, occasioned by the retirement of Mr. Stevenson, will not be filled. In other words, that Mr. Holt will act as President and Engineer of the Company. A hearty vote of thanks was passed to Mr. Joseph for his services to the Company during the past 30 years, and it was also determined to increase the capital stock in the sum of $500,000, the new shares to be allotted pro rata (1 to 5) among the present shareholders.

THE proprietors of the leading Cleveland (O.) hotels have refused to continue the lighting of their establishments by incandescent electric lamps since the issuance of an order by the local electric companies that meter measurements of currents were to be the rule hereafter.

THE Edison Illuminating Company, of Milwaukee, Wis., has issued the following schedule of rates: 16 candle power incandescent lights, 1 cent per hour each, subject to a discount of 25 per cent. on monthly bills of $25, and a discount of 50 per cent. on monthly bills over $50. The minimum charge to any consumer is $1 per month. The discount allowed heretofore was 5 per cent. on all bills up to $50, and 10 per cent. on bills in excess of that amount.

ON the 9th inst. the House passed a bill reducing the price of gas in the District of Columbia to $1 per 1,000 cubic feet. The opinion prevails that it will fail to secure the consent of the Senate. Whether the bill becames law or not this year, the Company might as well recognize the plain fact that it will have to come to the dollar rate sooner or later, and its managers might as well take time by the wing and come to the inevitable rather than be forced to it. There is not a doubt in the world that had death not ended the career of Mr. George A. McIlhenny the dollar rate would now be on in Washington.

A BOSTON correspondent forwards the following: "The data published under the auspices of the National Electric Light Association do not appear to show that utilization of energy, that vaunted superiority of method, machines and mind which it has been so many times stated was to overthrow the gas industry as a light and heat producer, and the gas engineer may be excused if in a friendly way he 'gets back' at his electrical brother for the many flings made in the past at his wastefulness and lack of ability. From time to time results have been published, but this is the first time that an authorized statement has appeared as to what the companies are actually doing in the utilization of the energy at their command, and a glance at the results obtained may be of interest to us when compared with those of our own industry. The average result of a large number of stations is given as 91.7 watt hours' output per pound of coal used. What does this mean? As there are 746 watts in a horse power, it means that $\frac{746}{9.7}$, or over 8 pounds of coal are used in producing lights. As a good incandescent lamp produces a candle power for 3 watts, it also means that each pound of coal produces 91.7 ÷ 3, or about 30-candle power light in an incandescent light at the station; or, if it is carried through a transformer, the amount of light can be reduced, everything considered, probably 20 per cent., leaving 24 candles per pound of coal used. Taking the case of an arc light, what does it mean? That 8 pounds of coal produce 1-horse power. One-horse power will produce and distribute 1 full arc light, equal to, substantially, 600 candle power; or 1 pound of coal produces 75 candle light. Now, what are we in the gas business doing which will bear comparison with this? A gas works that is not producing 5 cubic feet of 16 candle power gas to a pound of coal, or 80 candles, is certainly not up to the average of the times; but the pound of coal is not entirely used up—there is tar, coke, and ammonia water; and it is a poor and small works which does not net one half the cost of its coal for residuals, so we may say that one half pound coal equals 80 candles, or 1 pound coal equals 160 candles, certainly a long lead in our favor, without taking what advantage we have in the improved burners. The heating problem can better be discussed later, when the electrical engineer takes stand upon one ground or the other—either the advantage of the electric light on account of the small amount of heat produced, or its advantage on account of the large amount of heat produced cheaply; one or the other seems to be of necessity wrong. Seriously, let us hope a lesson has been taught about publishing statistics of this sort; but little good can come of it. If it be true, which we cannot believe, it is folly to publish it; if it be untrue, it is certainly folly to publish it as authorized. The statistic feature has been tried by older Associations and always failed. The man to man comparison is the only profitable one."

EARLY this month Austin, Texas, was the scene of a damaging conflagration. One of the principal sufferers was the gas works, which was temporarily shut down, putting the lights out in many stores and residences.

A CONSOLIDATION of the gas and electric lighting interests of Eureka, Cal., has been perfected, and the combined enterprise will be hereafter known as the Eureka Lighting Company.

THE employees of the Lawrence (Mass.) Gas Company, whose duties occasion their entering the houses or places of business of the consumers, are clad in handsome uniforms, so that there can be no possibility of mistaking them. We are indebted to Agent Humphreys for a group photograph of the meter inspectors and repair men as they appear in their "official" costuming.

THE authorities of Toronto, Canada, are considering the advisability of engaging in the business of electric lighting on municipal account. This year the public electric lighting of the city represents an expenditure of $108,000, and the contract with the Toronto Electric Light Company expires in October, 1895. Meanwhile the service is being performed at the extremely low rate of 29¼ cents per arc per night.

MR. R. W. GORRILL, a prominent and wideawake business man of the Pacific Coast, whose offices are in San Francisco, but who resides in Oakland, is interested in a project for the establishment of a gas works in Oakland. He is now in the East, securing estimates on the cost of a plant rated to manufacture 500,000 cubic feet daily.

ELSEWHERE we give some extracts from the report of Mr. J. W. Patterson, Inspector of Illuminating Gas and Gas Meters, of Allegheny County, Pa., for the year 1893, in which mention is made of his reference to electric lighting efficiency and cost. We have since that writing obtained a copy of the report and herewith reproduce in full the Inspector's remarks on electric lighting: "Digressing, perhaps, from matters to which this report should be limited, I may be permitted to say a few words touching the relative efficiency and economy of electric light and gas illumination in domestic lighting. The basis of contracts for this character of lighting in Pittsburg is an incandescent lamp, for which the Company charges about 1 cent per hour, and its greatest efficiency under a certain and constant pressure will yield a light equal to 16 candles. I do not know of any electric lighting system for which the term of a lamp's service is claimed to be more than 600 hours, and I think all will agree that its greatest brilliancy is when first set, and from that time its illuminating power is depreciating, until finally it has to be replaced by a new lamp. If it lasts 600 hours, the average of its illuminating value would be about 8 candle power, but usually long before that time, if the lamp does not burn out, it changes from an incandescent to a dull red, and the consumer finds it necessary to renew it in order to obtain a good light, and this is an additional expense to the meter rate. Now let us see how the gas compares with electric illumination, both in light and cost: The Gas Companies of Pittsburg and Allegheny are furnishing a gas that is uniform and never less than 20 candle power; that is, 5 feet of gas burned under fair conditions, and with suitable burner, will give a steady and continuous light equal to 20 candles, and this will cost exactly one half a cent, while an electric light, for which at its highest efficiency only 16 candle power is claimed, costs one cent per hour. We thus find that the electric light costs 100 per cent. more than the gas, and at its best gives 20 per cent. less light, and, when it is considered that the illuminating power of gas is not variable, while the electric light is affected by the slightest change in pressure, we may safely say that the gas does not cost more than one-fourth as much as electric light."

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MONDAY, APRIL 16, 1894.

The Market for Gas Securities.

Consolidated is somewhat weaker than at time of last writing, the majority of the offerings of recent date undoubtedly having been made on realization account. All things considered, the shares are approximately at their normal value, and we do not look for material change in the quotations for some time. The opening bid price to day (Friday) was 135½, against 136½ a week ago. Mutual shows great strength, the bid price being 148, and Equitable is also in the ascending scale. Standard preferred is in good request. The Brooklyn situation is as unsettled as ever, the offensive preparations on behalf of Fulton-Municipal being in quite a forward state. The death of Mr. Henry P. Morgan, President of the Nassau Company, may complicate matters still further. Putting one thing with another, we would advise investors to leave Brooklyn shares alone. Chicago gas is on the eve of a move of some sort or another, and we think the move is to be on the rising side. Baltimore Consolidated is active and strong, at 66 to 66½. The rise in Consumers, of Jersey City, continues, 45 being freely bid for it, and the talk about a dividend, at the rate of 4 per cent. per annum, is more pronounced than ever. Laclede common is higher, at 17½ bid, and Bay State is uncertain, at 22 to 23. We note a sale at auction of $2,000 Medina (N. Y.) Gas and Electric Light Company's first mortgage 6's, at 55.

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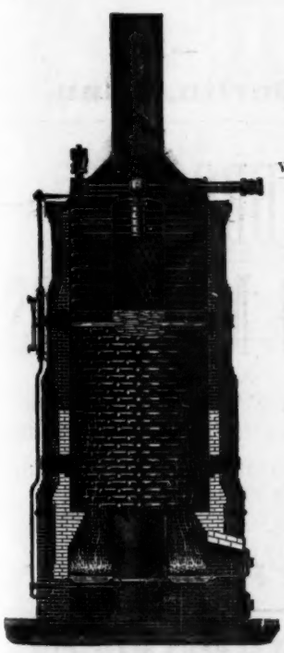

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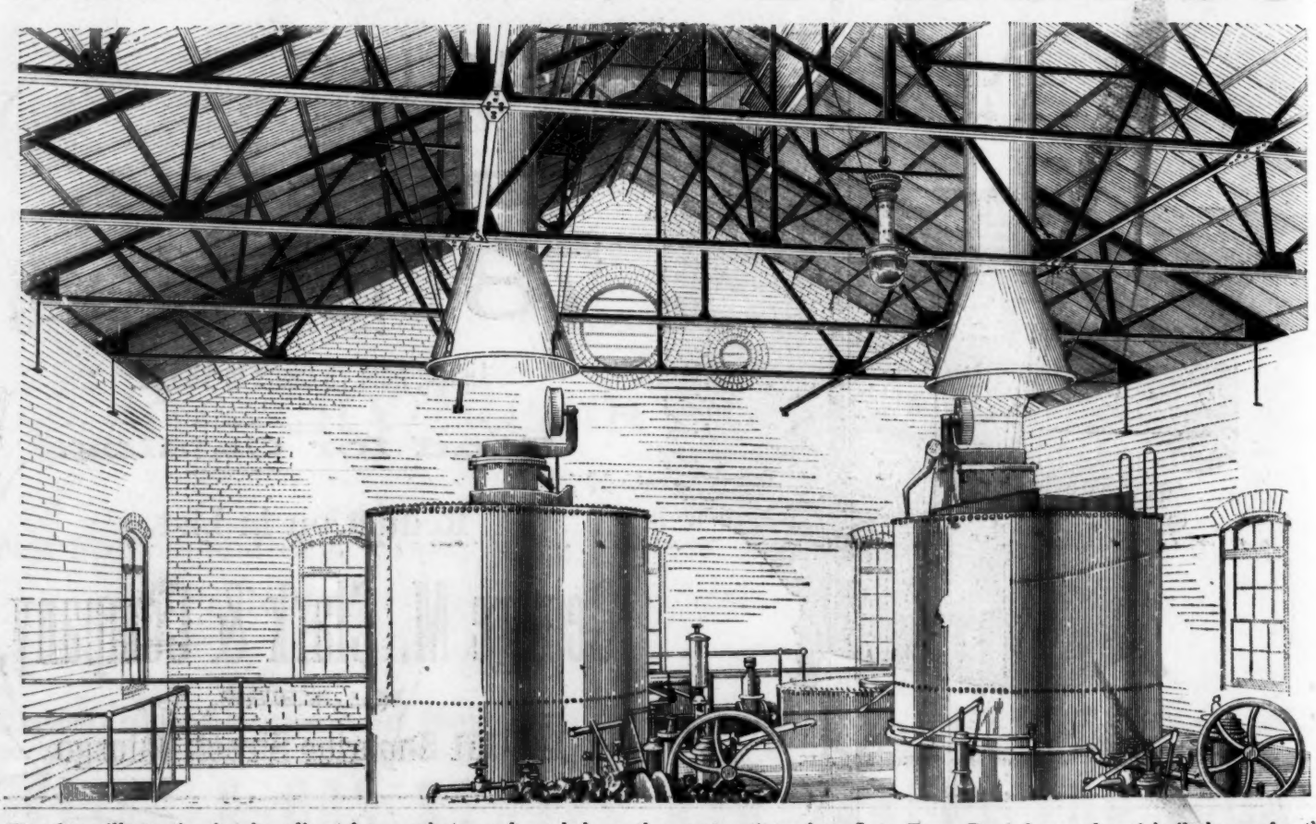

The above illustration is taken direct from a photograph, and shows the construction of an Iron Truss Roof designed and built by us for the Providence Gas Light Company, at Providence, R. I. The building is 40 ft. in width by 100 ft. in length, the side walls being of brick and the roof being entirely of iron—that is, iron trusses and iron purlins covered with corrugated iron. The building is ventilated by our Improved Ventilator, extending the full length of the roof, with side shutters opened and closed by cords from the floor. No woodwork is used in any way about the construction of the building.

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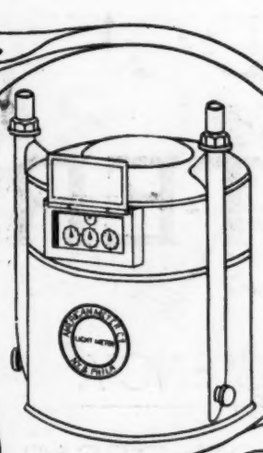

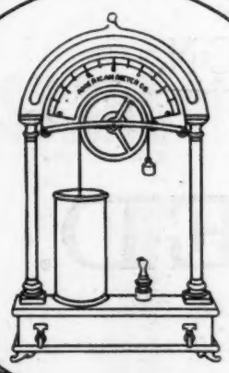

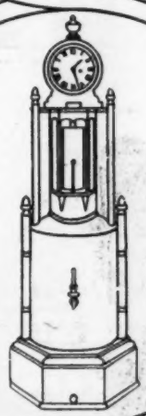

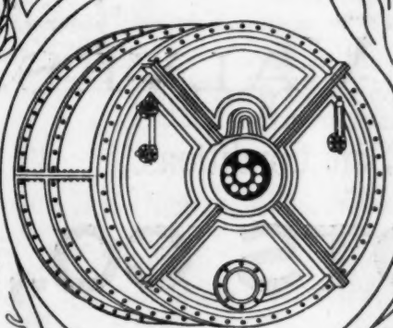

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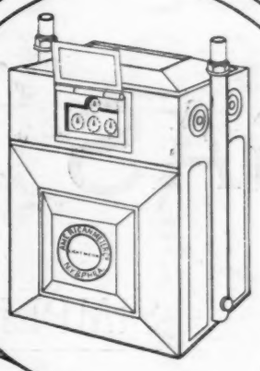
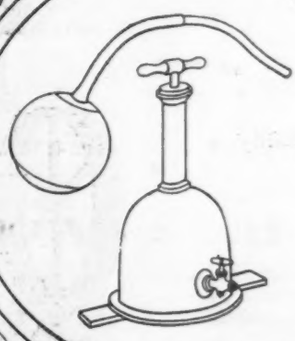
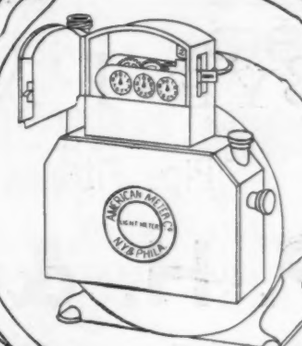
PUBLIC LIGHTING TABLE.

APRIL, 1894.

DAY OF WEEK.	DATE.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Sun.	1	6.50 PM	4.40 AM	6.10	4.55
Mon.	2	6.50	4.40	6.15	4.40
Tue.	3	7.00	4.40	6.15	4.40
Wed.	4	7.00	4.40	6.15	4.40
Thu.	5	7.00 NM	4.40	6.15	4.40
Fri.	6	7.00	4.40	6.15	4.40
Sat.	7	7.00	4.30	6.15	4.40
Sun.	8	7.00	4.30	6.15	4.40
Mon.	9	7.00	4.30	6.25	4.30
Tue.	10	11.20	4.30	6.25	4.30
Wed.	11	12.20 AM	4.30	6.25	4.30
Thu.	12	1.10 FQ	4.30	6.25	4.30
Fri.	13	1.50	4.30	6.25	4.30
Sat.	14	2.20	4.20	6.25	4.30
Sun.	15	2.50	4.20	6.25	4.30
Mon.	16	3.10	4.20	6.30	4.20
Tue.	17	3.30	4.20	6.30	4.20
Wed.	18	No L.	No L.	6.30	4.20
Thu.	19	No L. FM	No L.	6.30	4.20
Fri.	20	No L.	No L.	6.30	4.20
Sat.	21	7.10 PM	9.50 PM	6.30	4.20
Sun.	22	7.10	10.50	6.30	4.20
Mon.	23	7.20	11.50	6.40	4.10
Tue.	24	7.20	12.50 AM	6.40	4.10
Wed.	25	7.20	1.30	6.40	4.10
Thu.	26	7.20	2.20	6.40	4.10
Fri.	27	7.20 LQ	2.50	6.40	4.10
Sat.	28	7.20	3.20	6.40	4.10
Sun.	29	7.20	3.40	6.40	4.10
Mon.	30	7.20	4.00	6.45	4.00







TOTAL HOURS LIGHTING DURING 1894.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	244.10	January	423.20
February	195.30	February	355.25
March	206.20	March	355.35
April	169.40	April	298.50
May	162.10	May	264.50
June	135.40	June	234.25
July	146.30	July	243.45
August	162.20	August	280.25
September	174.10	September	321.15
October	211.20	October	374.30
November	221.00	November	401.40
December	245.30	December	433.45
Total	2274.20	Total	3987.45

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MECHANICAL CONSTRUCTION,

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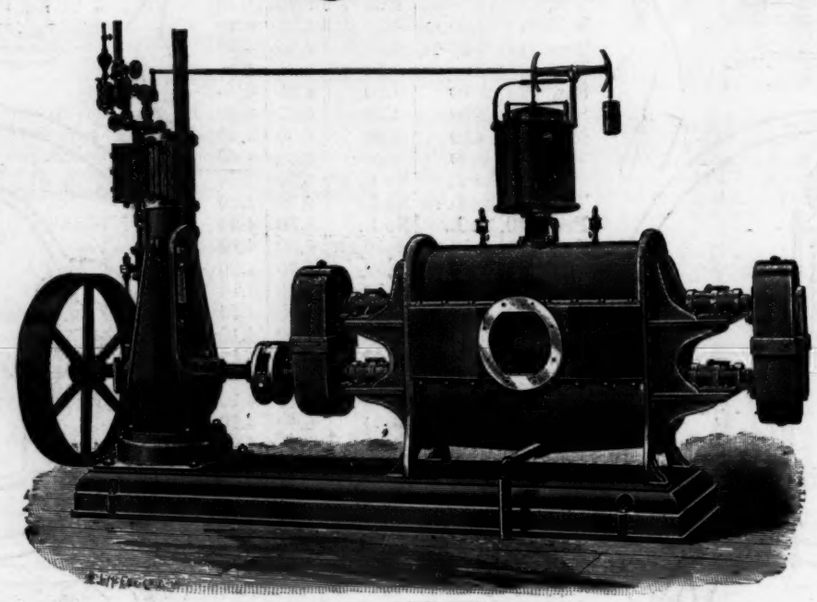

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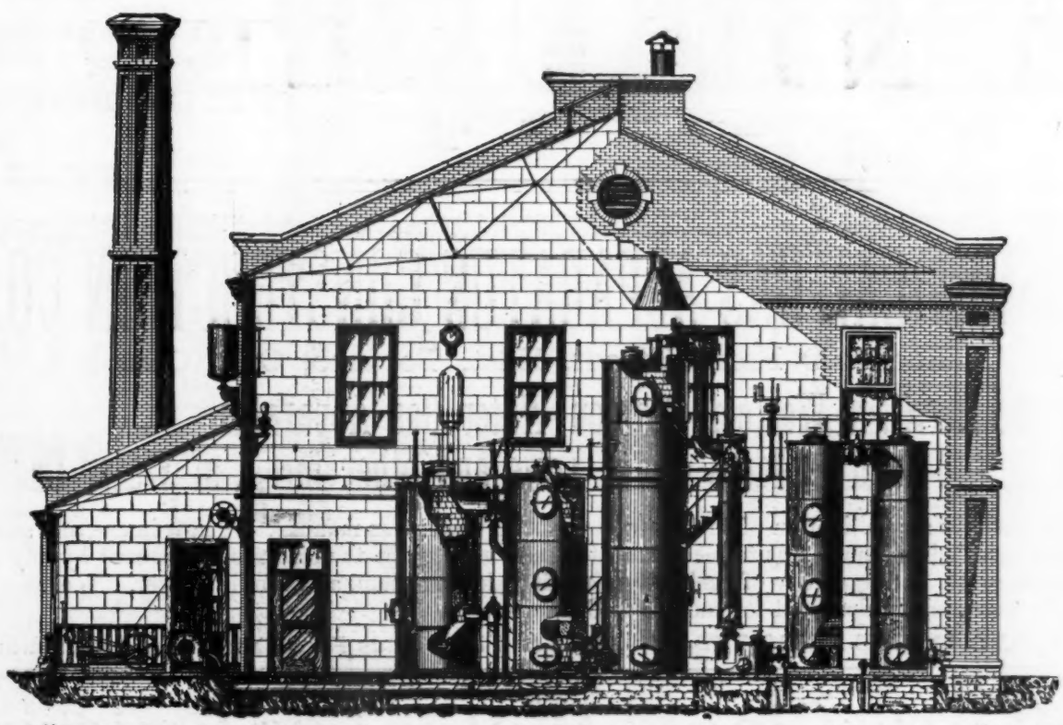

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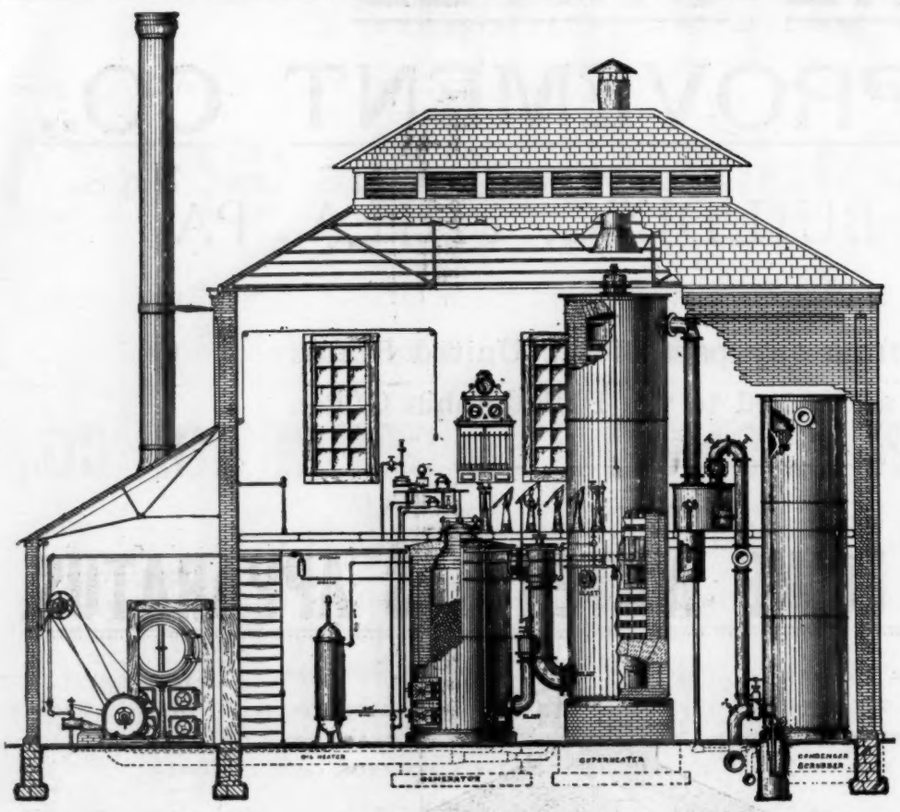

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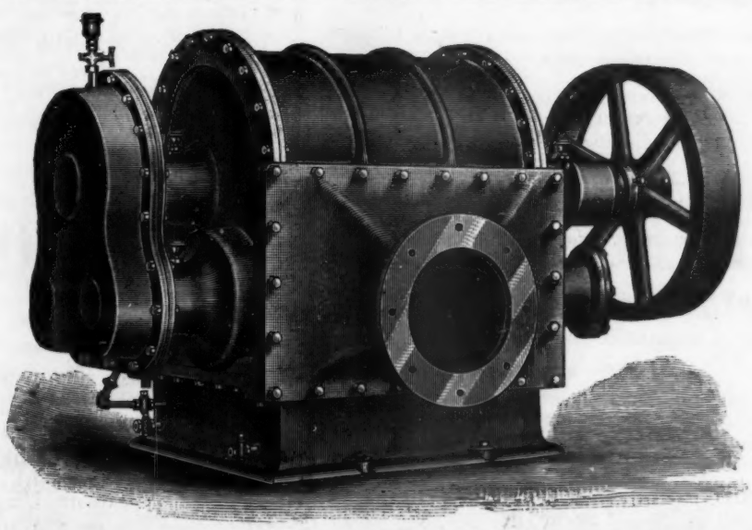

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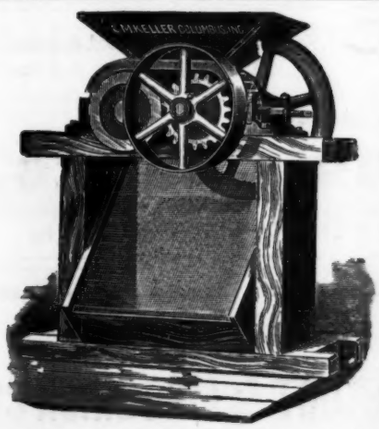

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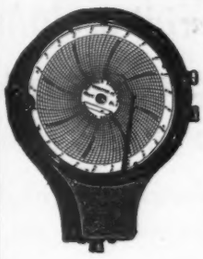

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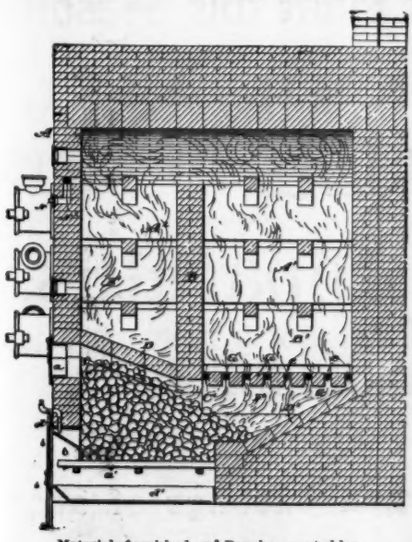

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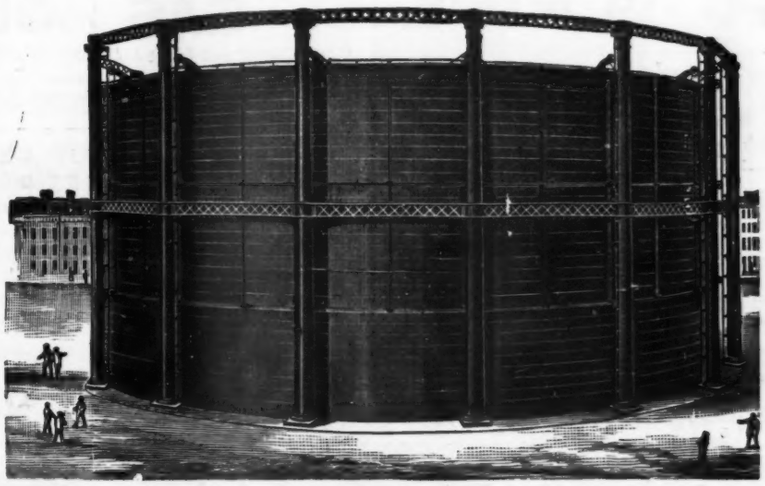

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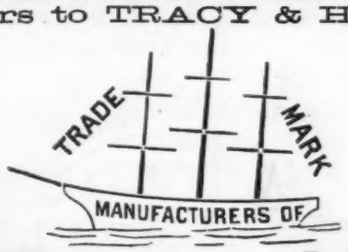

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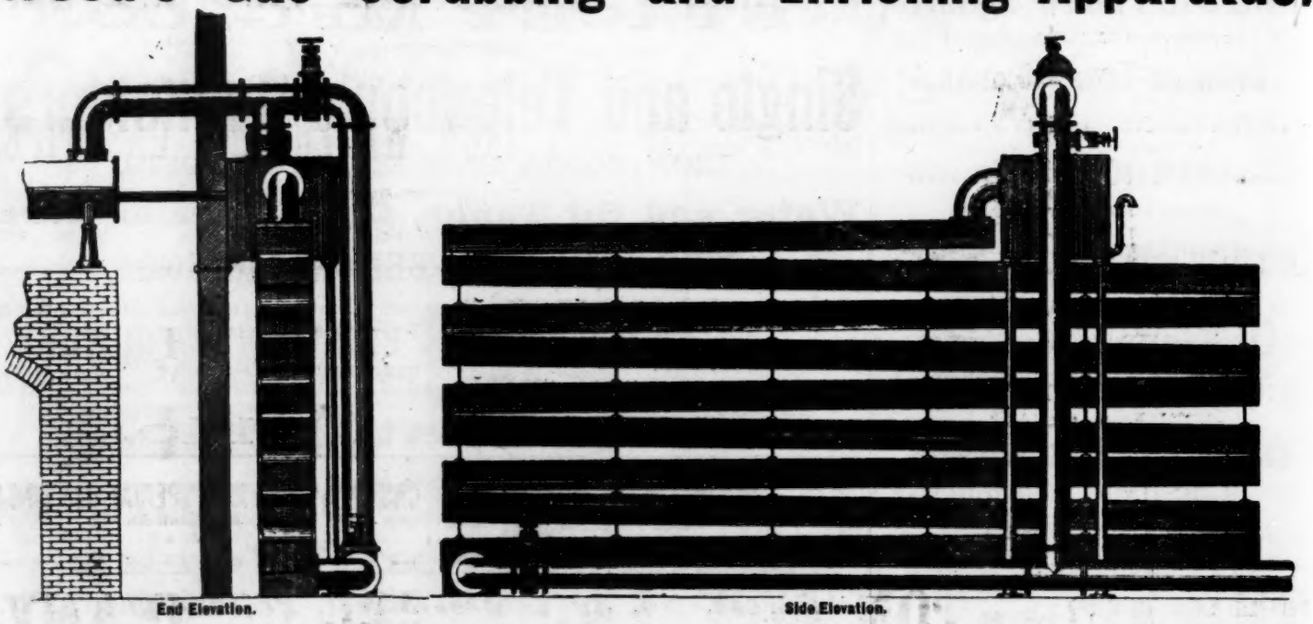

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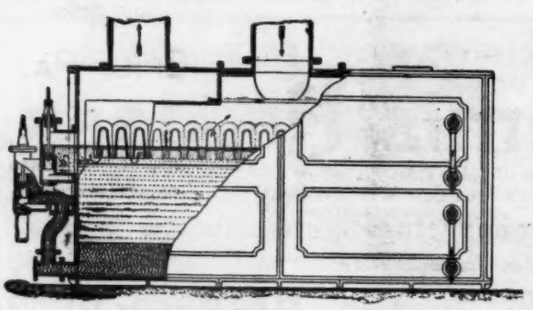
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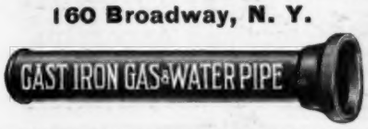

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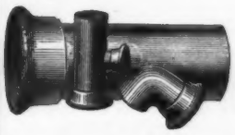

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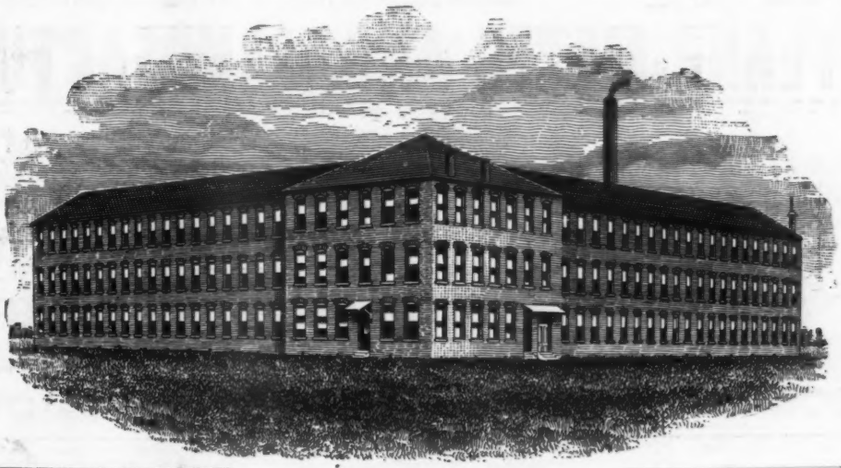

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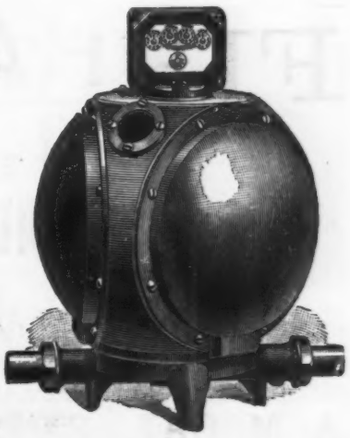

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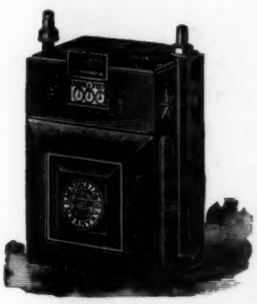

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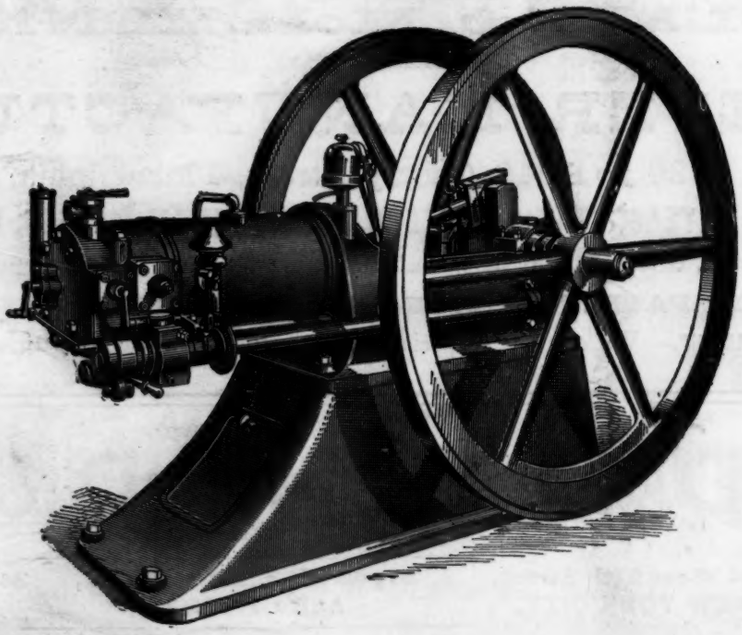

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